COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

Price: $9/year | November 1, 1972 | Vol. VI No. 44

NEWSPAPER

NEWS IN BRIEF

Voters Offered Chance To Protect Privacy

Special to Computerworld

LOS ANGELES – Proposition 11 on the California ballot next week is aimed at protecting the public from invasion of privacy through such means as centralizing and computerizing information.

The proposition would add privacy to the Californian's inalienable rights in the state constitution if it is approved by voters.

"The proliferation of government snooping and data collecting is threatening to destroy our traditional freedoms," according to its proponents: Assemblymen Kenneth Cory (D-Garden Grove) and State Senator George R. Moscone (D-San Francisco).

The proposition would create "a legal enforceable right of privacy for every Californian," they claimed.

Supreme Court Reconvenes On Software Patents

WASHINGTON, D.C. – The Supreme Court is finally considering the pros and cons of allowing computer software to be patented.

Six justices participated in hearings Oct. 16, and the court is now in recess until Nov. 6, the day before the national elections.

Justices Blackmun, Powell and Stewart refrained from participating. Sources noted reasons are not normally given when justices stay out of a case. Officials in the office of the Clerk did say Supreme Court Justices decline participation "usually because they have some interest" in the outcome.

Officials could not predict when a decision would be forthcoming in the case, which is based on the Benson-Tabbott patent, but several sources said it would "not be much before the end of the year," at the earliest.

While the court could overturn all software patents, observers feel it will restrict its opinion to the one patent at issue, a conversion program for BCD-to-binary data.

On the Inside This Week

AT&T Told to Survey Users' Illegal Interconnections — *Page 13*

Low-Cost IBM OCR Unit Aimed at Small Users — *Page 15*

Communications 13
Computer Industry 21
Editorial 8
Education 20
Financial 30
Societies 19
Software/Services 11
Systems/Peripherals 15

Are You Ready to Go Metric Yet?

By Don Leavitt
Of the CW Staff

NORTHBROOK, Ill. – Neither the National Bureau of Standards nor the major computer manufacturers have spent enough time investigating what effect conversion to the metric system of measurement will have on existing DP systems, according to Joseph L. Pokorney, president of Innovative Management Systems.

He reminded a recent symposium of the ACM Special Interest Group on Computer Systems Installation Management (Sigcosim) that Congress has committed the U.S. to a ten-year conversion period, and warned his listeners that every DP system that handles "measurement sensitive" data will be affected.

Specifically, he pointed to consideration of data field sizes, data accuracy, handling of historical data and development of mathematical calculations as four major areas that will be affected by the switchover to the metric system.

Metric conversion offers the DP community an opportunity to overcome recent criticisms of "unprofessionalism," by meeting a significant problem head-on, before it gets out of hand, he said.

Initiate Metric Awareness

DP managers should initiate metric awareness programs at the top level of their organizations, and an impact analysis of every DP system application in operation or being designed should be conducted. Each DP manager should develop a metric conversion plan, Pokorney added.

He noted that each metric unit is intrinsically more or less precise than the customary unit it replaces. The selection of appropriate field sizes is "quite significant" and the inherent differences in precision also have a major impact on numeric accuracy, he warned.

Centimeters are much more precise than inches, and kilometers are more precise than miles, he explained, but meters are less precise than feet and kilograms are much less precise than pounds. This difference in accuracy means that metric units require more or less digits than do customary units

(Continued on Page 6)

Canadians 'Fear' Some DP Usages

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – While most people appreciate the benefits of computers in the economic and scientific areas there is still a "latent fear" of depersonalization and loss of control over decisions affecting their personal lives.

This is the basic conclusion drawn from a new survey of individual attitudes toward computer systems and their uses.

The study, which surveyed 1,030 persons through home interviews in a number of communities throughout Canada, found 85% of the people had either direct or indirect (computerized billing, etc.) contact with computer systems.

While 53% of the respondents agreed that computers would enable government and businesses to make better decisions, 71% also indicated they believed computers will cause unemployment, according to Thomas L. McPhail, of the Canadian department of communications.

McPhail, who presented the results of the study during the First International Conference on Computer Communication, said contact with computer systems was highest among urban dwellers, males rather than females, higher income rather than lower, being under 50 rather than over, and professional or white collar rather than blue collar.

Unemployment Fears

Referring to the employment figures, McPhail identified two relevant points:

- "Although the perception vis-à-vis reality may not be real (the computer may not cause unemployment), the consequence of the perception becomes real (people fear the introduction of the computer, particularly in the work environment).
- "Positive reactions are negatively correlated with occupation. The blue collar working class was very much (74%) threatened by the computer," he added.

The fear of the effects of computers and computer systems on the respondents' personal lives was surprisingly high.

In response to the statement that "computers will take over our personal lives," a surprising 28% agreed.

At the same time, almost 73% agreed that computers would provide more leisure time.

Computers were also seen as a threat to family life by almost one-third of the respondents to the survey.

And almost two-thirds of the people indicated that they felt computers were depersonalizing life.

In response to the statement that "computers make you think individuals are just becoming numbers," 62% indicated agreement.

The image of computers as thinking machines also appears to be widespread, according to the study.

(Continued on Page 2)

CW Photo by Ronald A. Frank

Arpa Goes Public

Attendees at the ICCC conference were able to access the Arpa communications network through special demonstration terminals. Mike Desourdy and Randy Rettberg, of Bolt, Beranek & Newman explain the TIP processor to Ben Blue of Honeywell. The TIP connected the terminals to the Arpa net. (See story on page 4).

Value-Added Networks Will Aid Data Users

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The specialized needs of data communications users may require the establishment of "value-added" networks, according to Clay T. Whitehead, Director of the Office of Telecommunications Policy.

Speaking to more than 800 computer communications professionals attending the first International Conference on Computer Communication (ICCC), Whitehead said these networks would utilize common carrier transmission facilities with switching, error control and other special services provided by "separate equipment."

Citing a "definite knowledge gap" that exists between the computer and communication disciplines, Whitehead said this gap must be closed.

Joining Whitehead in a keynote session that explored computer communications in "industrially advanced nations," were Dr. S.I. Samoylenko, vice-chairman of the Council of Cybernetics for the USSR Academy of Sciences; Yasuo Makino, director of telecommunications for the Japanese ministry of posts and telecommunications; and T. Larrson, deputy director general of the Swedish telecommunications administration.

In Russia, computer capabilities are organized along industry lines, Samoylenko said, adding that 1,800 factories will have computerized operations by 1975.

The key to the success of present Russian computer operations lies in the standardization of about 100 functions including standards for such systems com-

(Continued on Page 4)

Crime Via Computers

'Inflexible' DP Systems Said to Attract Dishonesty

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – "The concentration of data as a result of computer processing and mechanistic, inflexible rules of processing create new opportunities for dishonest people."

But at the same time, the concentration of economic data in computer systems may lead to a decrease in the number of economic crimes even though the value of each crime may be higher.

These are some of the comments of Donn B. Parker of Stanford Research Center at the First International Conference on Computer Communication.

He noted that computer and communications systems are "fast becoming the subjects, environments and tools in criminal and disputed acts as the transition from manual to automated processing takes place."

Parker said that computers figured in crimes in two ways:

- They were sometimes the target of criminals or vandals
- They had been used as tools by criminals intent on such crimes as embezzlement and fraud.

Presently there is no uniform way to describe computer related crimes, he said, noting that they can be "included under fraud, theft, larceny, forgery, counterfeiting, defalcation, peculation, extortion, espionage, embezzlement, robbery, burglary, conspiracy or vandalism."

Elusive Motivation

"Motivation to perpetrate computer crimes is an important but elusive concern," he added, noting the reason for the criminal acts includes "revenge, competition, politics, challenge to ability, power, wealth, avoidance of harm, sympathy to the desires and needs of others, respect, peer group acceptance and absence of positive motives."

The study of computer related crime is needed, he said, for the security of computer and communications systems.

Adequate and cost-effective security should be developed by starting with a knowledge of the threats to these systems, he said.

"Threats should not be confused with methods of penetration of systems such as computer facility accesses, software trapdoors, masquerading, piggybacking, password detection and wire tapping. These are actually the technical methods of penetration and infiltration," Parker postulated.

Threats are the potential and actual actions of people. The nature of people-produced threats includes circumstances of people's actions, their ability to act, the procedures they use, and the technical methods they can employ, he said.

"It is important to take the position of looking outward through the external interfaces of the systems to the surrounding environment to successfully discover and analyze threats," he added.

Poking Problems

"Poking about in the system itself to find weaknesses and theorizing points of unintended penetration with little knowledge of the threats will only lead to serious discontinuities and inconsistencies in security," he contended.

In addition, he stated that limiting the strategy for developing security to penetration analysis and evaluation of assets to be protected is not enough.

"For example, it may not take into account the multiple targets and combination of penetration methods including bribery of employees that may be involved. The owner's evaluation of the various assets to be protected may not coincide at all with the values placed on them by potentially dishonest people," he added.

Future Predictions

"The pervasive penetration of computers and data communications into the functioning of society is justification enough to predict a growing level of crime related to information processing systems," he said.

Parker noted that many of the computer systems presently in use or planned for the future will be used directly in the processing of the wealth and information of society.

He also noted that well over 2 million people will be working directly with computer systems by 1975, about 3% of the workforce of 80 million in that year.

Because of the large number of people involved with DP and the value of the information stored in computer systems, it is possible to make "a strong but not conclusive argument that financial and informational crimes will tend to be associated with computer processing and data communications," he said.

At the same time, he noted computer processing and data communications result in greater concentration of data and produce more automation and uniformity in handling.

This increases, he stated, the opportunity for protecting sensitive data, as does the technical nature of computer systems and the technical knowledge needed to overcome the protections.

The increased complexity of technology and sophistication of security will require greater knowledge to penetrate systems thus reducing the number of potential penetrators, he said.

"However, when this expertise is used against automated systems which are processing great concentration of wealth and vital information at high speed with little human intervention, the losses per act from successful but fewer dishonest acts should be expected to rise," he warned.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM Reg. U.S. Pat. Off.

ROBERT M. PATTERSON, *executive editor.* V.J. FARMER, *news editor.* RONALD A. FRANK, *technical news editor.* E. DRAKE LUNDELL JR., *computer industry editor.* DONALD LEAVITT, *software editor.* EDWARD BRIDE, JUDITH KRAMER, MARY UPTON, MICHAEL WEINSTEIN, *staff writers.* MARVIN ARONSON, LESLIE FLANAGAN, *copy editors.* PATRICIA M. GAUVREAU, MARGUERITE Y. ZIENTARA, *editorial assistants.*

ALAN TAYLOR, J. DANIEL COUGER, DAVID E. FERGUSON, FRANK GREENWOOD, *columnists.*

J.H. BONNETT, *European bureau.*

NEAL WILDER, *national sales manager;* DOROTHY TRAVIS, *sales administrator;* FRANCES BLACKLER, *market research.*

LEETE DOTY, *production manager;* HENRY FLING, *production supervisor.*

EDITORIAL OFFICES: 797 Washington St., Newton, Mass. 02160 (617-332-5606). Europe: Computerworld, c/o IDC Europa Ltd., 59 Grays Inn Rd., London, W.C.1, England (01-242-8908).

Second-class postage paid at Boston, Mass. and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington Street, Newton, Mass. 02160. © 1972 by Computerworld, Inc.

Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to publication manager.

25 cents a copy; $9 a year in the U.S.; $10 a year in Canada; all other foreign, $25 a year. MARGARET PHELAN, *circulation manager.* Four weeks' notice required for change of address. Address all subscription correspondence to circulation manager, Computerworld, 797 Washington St., Newton, Mass. 02160.

W. WALTER BOYD, *publication manager.* PATRICK J. McGOVERN, *publisher.*

BPA AIP AIA

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160.

Blue Collar Workers Feel Threatened by DP

(Continued from Page 1)

McPhail's figures indicate over half of those studied felt that computers will make people think less.

Personal Privacy

In the area of personal privacy, 37% indicated agreement with the statement: "Computers threaten our personal privacy."

The people surveyed also had definite ideas on how computers would affect future lifestyles and society.

Of the respondents, 36% indicated that society would be changed either "entirely" (6%) or "a great deal" (30%) through computerization.

But there was greater agreement on the effect of computers on future lives, with 50% indicating computers would either change life styles entirely (11%) or a great deal (39%); 36% felt there would be some change, and only 7% felt there would be no change.

In summary, McPhail said, "the research points to three major items:

- "Attitudes toward and response to the computer elicit distinct, specific and selective reactions.

Technical Symbol

"To most people the computer is becoming the overriding technical symbol of the 20th century. Yet, there probably is very little awareness of the technical complexity of the device.

"But there is a considerable amount of perceived awareness of both its existence and its impact.

- "Many of the people express two sets of conflicting attitudes toward computer technology.

"On the cognitive level many people appreciate the benefits derived from increased computerized systems in terms of medical, scientific and technical progress; yet, at the same time, these same people express considerable affective hesitation in terms of what the computer will actually do to them in terms of interpersonal relationships and their day-to-day activities.

- "There is a latent fear of depersonalization and loss of control over decisions affecting one's behavior, and the computer somehow represents the frustration experienced in this situation."

Because of this study and other recent such surveys, the most notable one being the joint project of Afips and Time Inc., McPhail concluded: "What happens in the computer world in the future may no longer be as much a technical or economic issue, but rather a sociological-public acceptance one."

ATTACH LABEL HERE for address change or inquiry. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels. Please let us know four weeks before you plan to move. List new address below and include a current mailing label or your old address.

CHECK HERE TO ENTER YOUR SUBSCRIPTION

☐ 1 year – $9*

*$10 a year in Canada; all other foreign, $25 per year.

☐ Charge My American Express Account:

If charge we must have cardholder's signature:

☐ New subscription
☐ Change of address

First Initial | Middle Initial | Surname
Your Title | November 1, 1972
Company Name
Send to: Address
City | State | Zip Code

Address shown is: ☐ Business ☐ Home ☐ Check here if you do not want to receive promotional mail from *Computerworld.*

COMPUTERWORLD Circulation Department
797 Washington St., Newton, Mass. 02160

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

YOUR INDUSTRY
01 Mining/Construction/Oil & Refin.
02 Manufacturing – Computer or data system hardware/peripherals/other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm Sys/Transport
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureaus/Software/Plann.
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Govt.
12 Communications/Printing/Publ.
13 Other:

YOUR FUNCTION
01 Corporate Officer
02 Data Processing & other Operational Mgmt
03 Data Processing Professional Staff
04 Consultant
05 Lawyer/Accountant
06 Engineering-Management/Scientific/R&D
07 Sales/Marketing/Account Exec.
08 Librarian/Educator/Student
09 Other:

GE's new Mark III gives you real control of time-sharing costs

If you think time-sharing is a good thing gone wild, we have a way to tame it. It's General Electric's Mark III.

Mark III is not just another time-sharing system, but a new approach to information processing. It's a single, unified service that combines the response of interactive time-sharing, the economy of remote batch processing, and the reach of a worldwide communications network.

Mark III has a comprehensive budget control system that lets you allocate computing dollars—by project, department, individual—tailored to your needs. It will automatically administer the allocations. And even give you daily reports at your own terminal.

Mark III not only helps you control costs, but actually reduce them. You can save one-half or more of your processing costs just by moving your time-sharing programs into remote batch operation.

Mark III is an integrated network of nearly 100 interconnected computers. With a network this size, each computer performs that task for which it's best suited—communications, interactive time-sharing, or batch processing. The result is a service that can tackle all your computing easily, reliably, and economically.

General Electric was first to introduce time-sharing service in 1965. First to establish an international information processing network linking over 250 locations in North America and Europe. And now, with Mark III, first to put you in real control of your computing dollars.

If you're a Mark II user, Mark III offers you major new features and is fully compatible. If you're not, it's time to make a serious comparison of Mark III with whatever information service you now use. Take control. Phone 800-638-0971 or write us at 7735 Old Georgetown Rd., Bethesda, Md., 20014. We're ready to help.

291-84A

GENERAL ELECTRIC

WORLD LEADER IN INFORMATION SERVICES

Commercial Arpa Concept Faces Many Roadblocks

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – As part of a "special project" at the ICCC, attendees were able to access the interconnected Advanced Research Projects Agency (Arpa) and Tymshare Communications Networks.

Described as the first public demonstration of the Arpa network, the interconnection of the scientific government-funded Arpa net with the commercial Tymnet network, was done on an experimental basis.

The Arpa net is actively working to attract support for a commercially operated version of its present resource-sharing network, according to an Arpa spokesman.

Commercial Version

Although a commercial version of Arpa would probably provide users with the most powerful computer/communications network available, some difficult problems first have to be overcome, according to observers attending the ICCC.

The Arpa net was set up using government funds and presently includes such university DP systems as Multics at M.I.T. and a 360/91 at UCLA.

The net was configured under an Arpa contract by Bolt, Beranek and Newman (BBN) which is also connected to the network with its CPUs.

BBN is currently offering Arpa hardware to existing time-share vendors, according to observers. An Interface Message Processor (IMP) would cost about $45,000 while the Terminal Interface Processor (TIP) would cost about $92,000.

In addition to the cost of the Imp and Tip, the Arpa user will have to acquire interface hardware which can range from $10,000 to $15,000, depending on the characteristics of his host mainframe, according to BBN estimates. And modification of "host executive software" could require from four to 12 months of systems programming at an unspecified price.

In the category of annual costs, the user would pay from $5,000 to $7,000 in maintenance fees and $16,500 plus 30 cents per kilopacket of data in excess of 4,500 kilopackets per month. An Arpa kilopacket is equal to one million bits of data.

Even if the price of the hardware attracted the time-sharing vendors, it is not clear who would provide the data lines and the processors.

Existing CPUs in the net were largely funded by the government and could not operate in a commercial environment, observers say.

At least two companies are known to be considering the operation of commercial Arpa-type facilities. These are Packet Communications Inc. and Telecommunications Networks Inc.

But some serious questions concerning the exact regulatory status of an Arpa-type carrier have yet to be resolved. A company supplying commercial Arpa-type lines might have to be classified as a type of specialized common carrier, observers say.

Business Users

In addition, a new network would have to gear itself to serving business users compared with the scientific emphasis of the existing network.

And even if a commercial network is configured, the vendor would have to convince users that their data was secure. Many DP managers would be reluctant to have their proprietary data bases stored on remote CPUs, observers feel.

But an Arpa spokesman said a commercial version of Arpa will be in operation within a year and a half. The data security problems to insure the users' data have been virtually solved, he said.

More Economical

Despite the many problems that have to be overcome, one researcher currently using the Arpa net at his university said shared processing techniques would be more economical for users.

Commercial Arpa users would enjoy line charges below the rates they now pay to the phone companies, according to a spokesman.

The ICCC attendees accessing the Arpa and Tymshare nets were impressed with the resources available through the 36 terminals installed at the conference.

The terminals ranging from teletypewriters to CRT terminals, operating at speeds from 110- to 2,400-bit/sec, were connected to the Arpa net via a 50 kbit circuit supplied by AT&T.

An Arpa Tip with Bell 303 data sets connected the terminals to the network.

A book of Arpa "scenarios" was supplied to conference attendees. One of the most popular programs allowed users to get a printout of current weather conditions in Paris.

The information was transmitted via Tymnet's transatlantic service to California and fed to a Tymsat (modified Varian 620) processor at Ames Nasa Research Center onto the Arpa net for transmission to the conference demonstration.

Foreign Communications Systems Expanding

(Continued from Page 1)

ponents as tape and drum memories, keyboards, and I/O specifications, Samoylenko said.

Among the computerized systems now operating in the USSR, Samoylenko listed an airline reservations system, a patient management system for medicine and public health, and a diagnostic on-line system for heart disease. This on-line system has been tested experimentally over data channels of several miles, he added.

In 1971 there were about 300 data communications systems operating in Japan, Makino told the conference. Three types of data facilities are available to Japanese computer users, Makino said.

Users can configure privately owned and operated networks, with their own lines; they can have privately owned networks with lines supplied with the Nippon Telegraph and Telephone Corp. (NTT); or they can subscribe to facilities which are owned and operated by NTT, Makino said. Joint usage of data facilities is permitted where "closed business relationships" exist between the data users, he added.

Japanese users are presently operating on about 12,600 circuits of which about 53% are related to banking, 20% are used by the government, 15% are utilized for management functions, and 11% are used for stock dealings, transport management, and scientific uses, he said.

In Sweden, about 15 teleprocessing systems are "under implementation or planned" Larrson told the conference.

An evaluation has been made on whether a common data network would be feasible, the Swedish official said. The study shows that a common network could operate "at roughly the same costs" as the present individual nets, he said. But a lack of standardization would require a common net be based on message switching, he added.

The first modems were introduced in Sweden in 1962. The Swedish telecommunications administration currently supplies modems operating at speeds from 200 bit/sec to 40.8 kbit/sec with the annual user costs ranging from $261 for the slow speed devices to $2,613 for the highest speed units. An "initial fee" which must be paid by the user is extra, Larrson said.

While U.S. data systems have advanced "far ahead" of those in Europe, the Europeans have the advantage of studying our methods and perhaps implementing their networks more quickly toward "sophisticated solutions," Larrson said.

The ICCC brought together international computer and communications experts to consider a variety of common problems. The 3-day conference included more than 20 sessions dealing with such topics as social responsibility, data banks and privacy and digital network design.

Our Jack Flynn can get you IBM-360 peripheral equipment for as little as one-third of the jack IBM gets for it.

Like 2311's, 2841's, 2401 Models 2 and 3, Models 40 and 50 Core Storage.

For as long as you need it.

Anywhere you need it.

For as little as one-third of what it's costing you to rent now. As little as one-third.

From us, Bankers Leasing Corporation, as the marketing and administrative representative for Diebold Computer Leasing, Inc.

It's as simple as it sounds.

And so is the way we do business.

We'll also lease you an IBM 360, Model 30, 40, 50, or 65 in any configuration to meet your needs.

For less.

And after it's installed where you want it, IBM continues to maintain it.

For the length of the lease.

Just call Jack here collect.

And he'll have our man out there nearest to you, turn up with a proposal.

That you can't turn down.

Bankers Leasing Corporation

1255 Boylston Street / Boston, Mass. 02215 / (617) 266-4950.

Advertisement *Advertisement*

Leasing News...

RANDOLPH COMPUTER CORPORATION

LARGE COMPANIES . . . those with sales over $100 million, have traditionally been the major customers for EDP equipment leasing. Over 20% of their installed hardware was on third-party lease in 1971. However, in 1972, smaller companies, $10 to $100 million in sales, are quickly identifying with savings gained through EDP leasing. Interest and action on the part of these firms are accelerating rapidly — with 370/135 and 370/145 flexible 3 to 8-year Randolph lease plans becoming very popular across all industries.

— RCC —

EDOS . . . the Extended Disk Operating System software package, now being made available by Randolph Computer Corporation, is "one of the best things yet to come along for System 360 users". EDOS is a collection of additions and performance enhancements to DOS. With EDOS from Randolph, users can easily improve the throughput of their typical DOS installations by as much as 25 percent.

— RCC —

"THE FIRST MAJOR LEASING COMPANY . . . to engage in 370 risk leasing was Randolph Computer Corporation", industry observers have been noting in the trade press. "Randolph stepped in when other lessors held back primarily because it has the strong financial backing as a subsidiary of Travelers Insurance."

— RCC —

NOW AVAILABLE . . . collection of case studies describing EDP users with money-saving leased computers . . . brochure outlining RCC's lease plans and services . . . Write Randolph Computer Corporation, 537 Steamboat Rd., Greenwich, CT 06830, or call (203) 661-4200.

Motor Vehicle Network Turns to 'Man-in-the-Middle'

By Molly Upton
Of the CW Staff

ALBANY, N.Y. – The Department of Motor Vehicles is taking steps to improve service on its 300-terminal network by establishing a central liaison between the local registry offices and IBM and the New York Telephone Co.

The department has established the post of network manager, who will receive all calls from users, talk to them, decide whether the phone company or IBM should be contacted, and deal with one man from each company responsible for the system, explained Basil Scott, administrative director for the Motor Vehicle Department.

"Basically, the problem was one of accountability. We didn't have a system of holding the companies accountable to the extent we should for a system this big," he noted.

"The people in the field (Registry personnel) weren't always sure whom they should contact at IBM or the telephone company, or within this department, for that matter. We had two or three different people here they should contact depending on the problem.

"Users in the field don't always know what the problem is, so they'll call the wrong guy who would pass the buck because he didn't know what they were talking about," Scott said.

"We hope we've closed that gap by making our man responsible, and then we'll hold the telephone company and IBM representatives responsible at the Albany level."

The terminals are linked to a multiprocessor 360/65. The system has been in operation for about three or four years, Scott said, and uptime averages 99.5%. But he admitted that the terminals are used in an "emotion charged" environment, when anything going awry would lengthen the line of persons waiting to have drivers' licenses renewed or issued.

Through improved centralized record-keeping of complaints, the department hopes to get a clearer picture of problems, and services rendered. In the past, local branches would often call up the local IBM service representative when problems occurred, or deal with a local phone company, rather than funnel complaints through the state level, Scott added.

Some hardware problems occurred when the department added some on-line programs to implement the new state title law. At the same time, a couple of terminals broke down, and part of the state was hit by the flooding from storm Agnes, so "everything hit at the same time," and it was hard to determine what was causing problems, Scott said. "We went at it and fixed everything in sight, and now things are running exceedingly smoothly."

Another problem discussed with IBM was improvement of the preventive maintenance system. "We want them to do periodic maintenance, take a typewriter unit out, repair it, put another one in in the meantime. We hope this will keep the system up quite a bit more than it has been," he said.

Some of the terminal units are four-years old, he said, and the Selectric typewriter units have been breaking down, he noted.

The state is buying extra typewriter units, and the machines will be rotated and reconditioned on a systematic basis, he said. "We won't wait for them to break down, and won't wait for service calls," he said.

Bureau Nostalgic for Old System

BUFFALO, N.Y. – "Sometimes the old system is best," avowed Erie County Clerk Robert Grimm as the Auto License Bureau converted from hand-stamping auto registration applications to processing with a terminal.

"I felt the computer system was defective in concept right from the start because it takes so long," three or four minutes compared with about 20 seconds the old way, he explained.

By the hand-stamping process, when records were sent to Albany for keypunching, "we could handle all comers." He said the terminal system frequently goes down, which compounds the relatively slow turnaround service offered the public.

"Administratively, the computer is marvelous for them (the Department of Motor Vehicles), but what about the poor guy who has to stand in line while we're doing all this?" he asked.

The bureau now has 12 terminals instead of 10, which should help expedite processing.

With the institution of the state title law, the Erie County bureau became the last county to fully implement the terminal system.

"It is obviously faster to hand-stamp something then put it in a terminal," Basil Scott of the Motor Vehicle Department admitted, but added, "there are advantages to using a terminal because local offices get information" on whether the individual shouldn't be issued a document.

When breakdowns occur, local offices are requested to process applications by hand-stamping, then put the information into the system during slow hours.

IBM 370's
don't all cost the same.

CSA leases allow you to enjoy tomorrow's system at today's prices. Let CSA demonstrate to you the savings and flexibility you can enjoy.

For further information, please call: (617) 482-4671

Computer Systems of America, Inc.
a computer equipment leasing company.
79 Milk Street, Boston, Mass. 02109

Send for the 12 questions you should ask of any leasing company before you lease.

Name_____
Title_____
Company_____
Address_____
City_____
State_____ Zip_____
370 on order ☐ installed ☐
Model_____ Due Date_____

The brand new ITT Asciscope™ Display.
For $65.00 a month you get a complete computer terminal.

At last... a silent, high-speed, compact desk-top CRT display terminal with built-in modem and acoustic coupler. A complete package, including maintenance, for only $65.00 a month.
More good news: There's no complicated installation. All you need is a telephone or Data Access Arrangement, and you're in business immediately. And if the ITT ASCISCOPE you lease requires service—we'll replace it on the spot.
If you're ready for rapid, silent computer communications, with no need to reprogram TTY software routines, call (201) 935-3900 and ask for Jerry Porter.

DATA EQUIPMENT and SYSTEMS DIVISION ITT

ITT Data Equipment and Systems Division
International Telephone and Telegraph Corporation
East Union Avenue, East Rutherford, N.J. 07073

Rush brochure on new Asciscope.

Name _____
Title _____
Company _____
Division _____
Street _____
City _____
State _____ *Zip* _____

TAKE A CLOSE LOOK AT THIS BARGAIN!!

360-44 128K

WITH COMMERCIAL FEATURE

- Commercial Mode Faster Than A 360/30
- Scientific Mode Faster Than A 360/50
- Priced At $50,000 Below A 360/40

ALSO AVAILABLE:

- 360/40 G
- 1403 – 2
- 2804 – 1
- Several I/O Sets
- 2415 – 2
- 2314 – 1 (9 Spindle)
- 2311's

ACS EQUIPMENT CORPORATION
8928 SPRING BRANCH DR. • HOUSTON, TEXAS 77055
(713) 461-1333

Burroughs Unbundles Biggies

By Edward J. Bride
Of the CW Staff

DETROIT – Burroughs has unbundled the pricing of applications software for large computers on order and already installed. Current contracts will be honored, Burroughs said, but upon expiration, applications for large systems such as the B6700 will carry a separate price.

Systems announced earlier this year in the 700 series, such as the 4700 down to the 1700, were unbundled, Burroughs recalled, while admitting a new policy actually went into effect Sept. 1 for the older member of the family, the 6700.

Effective that date, all newly-ordered computers in the B6700 family – medium to large systems – had separately-priced applications, but not control software, the manufacturer reported.

Purchased systems that are already installed carry free usage of software for five years, the supplier said. These five-year agreements include free updates and modifications.

These agreements will not be affected by the policy change, Burroughs promised, adding current leases will also be unaffected. When lease renewal time arrives, however, the pricing of applications will be one new consideration, the company agreed.

For the past three years, applications have carried separate price tags in the Burroughs Series E and L minicomputers, and this policy continued with the new L8000 announced Oct. 19, Burroughs said.

The separation of prices on the 6700 is simply an "extension" of that policy, Burroughs said. The company stressed the current usage agreements are only "licenses to use" the applications, and do not represent outright sales of this software.

Expect 3.5 Million Voters

L.A. County Set For National Election

By Marvin Smalheiser
CW Correspondent

LOS ANGELES – Election officials here are preparing for the biggest computerized election in the nation with confidence that it won't be ruffled even if an earthquake shakes up a few punch cards.

A turnout of 3.5 million voters – 87.5% of those eligible – is expected at the polls on Nov. 7 in Los Angeles County, the largest voting jurisdiction in the world.

But James A. Riggs, election systems coordinator, said: "The process is pretty well shaken down now after five major elections. We think the system works very well."

It was not always so, for the county had a few nightmarish election nights with its punched card ballots.

Now it feels it is prepared to handle the ballots with 24 rented IBM 360/20s and peripherals. County equipment will include an IBM 370/155 for summary work and two 360/50s for backup.

The machines will be strategically placed to minimize problems should an earthquake or other natural calamity occur.

Riggs said the ballots will be counted in two tally centers, one in the downtown civic center and the other in a county computer center in suburban Downey, about 20 miles away.

About 1,000 persons will be involved in election night operations at the two tally centers, Riggs said.

A small army of people will be checking the conditions of ballot cards as they arrive at the tally centers to make sure they are machine acceptable.

Simulated Count

An intensive one-week training course will be given the week before the election and on the preceding Saturday trainees will go through a simulated ballot count.

Ballots will come into the tally centers by car and helicopters from 81 regional check-in centers, beginning about a half hour after the polls close.

Riggs said: "We should complete all card-to-taping in the early morning hours . . . 2 a.m. to 3 a.m. We should have a complete total tally between 6 a.m. and 8 a.m."

Registration Law Changed

The major problem election officials have this year, Riggs said, is that the law now allows only 30 days before the election for processing voter registrations instead of 54 days. This gives less time for producing precinct indexes, sample ballots and precinct registers.

IBM, which originated the Votomatic system the county uses, and Computer Election Systems, Berkeley, Calif., which now markets it, are acting as consultants.

During the election preparations, the county has been working with representatives from the political parties and the press, who will be observers on election night.

Tight Security

While extensive publicity was given to claims two years ago that the computerized system was vulnerable to fraud, Riggs was confident that security would be tight.

The ballot count, he said, will be checked by a random hand-count of precincts after the election. There will be extensive logic and accuracy tests performed before and after the processing is done.

A copy of the program will be submitted, as required by state law, to the Secretary of State before the election.

Riggs said ballots will be carried in sealed packages and delivered to tally centers by sheriff's officers. The counting will be done under the view of observers until they are sealed up in cabinets after the count.

Are You Ready to Convert to Metric Yet?

(Continued from Page 1)

to represent the same range of values.

Different Data Fields

In an "overly simple" example, he noted that representing 0 to 99 miles requires only two digits, while the equivalent range of metric units (0 to 159 kilometers) requires a data field of three digits. Only up to 62 miles (or 99 kilometers) can be represented by two digits in both systems, Pokorney noted.

Data carried in cubic inches accurate to one decimal place falls within 0.05 in. (+ or -) while the same one decimal place in cubic centimeters would provide +/-0.05 cm or +/-0.00305 in., which may be much more accurate than needed, he said.

Data Discontinuity

Systems that generate measurement sensitive data for use in forecasting, statistical analysis or other studies will be faced with a major discontinuity in their data.

"It will be difficult to compare the last five year's automobile performance data in gallons/mile with next year's data in liter/kilometer", he warned, "and cost accounting systems will suddenly have to generate unit costs per kilogram or cubic meter, while all previous data is in cost per pound or cubic yard."

Many of today's mathematical calculations incorporate time-honored conversion factors to allow changeovers from one form of measurement to another. With the coherency of the metric system, many of these factors will no longer be applicable. Calculations will ultimately be simpler but programming in this area will be impacted very heavily, Pokorney said.

The degree of impact from metric conversion will vary widely depending on the nature of the particular DP system. After conducting an impact analysis on each application, the DP manager should try to classify each to determine his conversion priorities.

The metric conversion plans should show the time phasing of the metric capability of the system, and an identification of the resources needed to make the conversion. New systems should be designed with dual capabilities, and logical operations should be clearly separated from mathematical processing to facilitate eventual conversion, Pokorney said.

"If each DP manager would only analyze the impact of metrication on his organization," he said, "he can demonstrate his professionalism by acting to reduce the effect of an inevitable change." If not, he added, the DP profession will again stand accused of not meeting the true needs of users.

Save your IBM computer and some money with a new CDC® core memory.

No need to outgrow your System/360 computer – there's a new alternative. Extend or replace its memory with a new Control Data® 23000 Core Memory System. You can increase capacity up to double its present size – all at once or in convenient increments. And you can save money because our core memory systems cost 20-40% less than theirs on the average purchase or lease.

With the new capacity you'll be able to take advantage of larger input/output buffers, more powerful compilers and other advanced software.

It's a move that's a lot less expensive than a new computer. And in many cases it's more effective than any other option.

In addition to savings through lower initial costs you also get economies from CDC's one-charge, unlimited-use maintenance price policy. It all adds up to top price/performance.

Our core memories are available for Models 30, 40, 50 and 65, in capacities ranging from 32,768 to over 2 million bytes.

All our core memories are completely hardware and software interchangeable with their IBM counterparts. No permanent alterations are required for installation. And there's no reprogramming expense involved.

And, like all Control Data products, our core memory systems are backed by world-wide customer engineering support.

Get all the details. Write: Control Data Corporation, Dept. CW-127, P.O. Box 1980, Twin Cities Airport Station, MN 55111. Or call our hot line collect: 612/853-3535.

CONTROL DATA CORPORATION
Your general store of computer products and services.

Local Companies Participate

Scouts Explore DP and Find Career Opportunities

By Ronald A. Frank
Of the CW Staff

NEW BRUNSWICK, N.J. – Computer science and data processing is one of the foremost career fields attracting today's high school students. This is one reason why there are now more than 270 Explorer posts specializing in DP in the U.S., according to Norman E. Berg, Exploring executive with the Boy Scouts of America.

While the programs of an individual DP post may vary depending on the interests of the members, many are sponsored by local companies with DP installations.

One typical post, organized within the last year in Manchester, N.H., by the New Hampshire Insurance Co., makes extensive use of the firm's DP capabilities.

"We try to give the members a touch of programming techniques seeing jobs run," is how Albert Bauer, post adviser, described the activities of Post 617. The members recently participated in a community project which gave them extensive DP experience.

"The post did a career survey study encompassing the southern part of New Hampshire. This is how we get in touch with the young high school people by surveying their interests. The DP post keypunched the survey results using IBM 029s at the New Hampshire Insurance Co.," Bauer said.

'Good Results'

"The girls who worked on the keypunch effort spent about 100 hours on the project. Volunteers from New Hampshire Insurance contributed their time to train the explorers in the operation of the IBM equipment," Bauer said. "It took a little while to teach the Explorers the card layout," Bauer said, "but the results were very good."

As part of the survey, high schoolers were asked to fill in a form selecting their first, second and third choices in career interest, Bauer, a statistician at the firm, said.

"The survey gave the Explorers a chance to see a job through from beginning to end," Bauer said. The survey covered about 18,000 high school students and gave the 27 members of Post 617 a chance to get first-hand experience, he said. Membership will probably grow to about 100, he added.

In Manchester about 80 students expressed a first-choice interest in DP while about 95 selected the field as a second choice for a career, Bauer said. These students will be invited to work with the post to develop their interests, Bauer added.

Any DP training that the members of the post receive is based on the spare-time efforts of Bauer and others on the DP staff at New Hampshire Insurance. The company also donates the use of keypunch and other equipment for the post.

Among the additional activities planned by the post are visits to other DP sites and training in programming and operating methods, Bauer said. And there are also tangible benefits for the sponsoring company, he added.

When the students graduate from high school and apply for a job at the company's DP department, the Explorer post members would get definite job preference, Bauer said. The time spent by the students in post activities gives them valuable experience that can produce a more productive employee for the company, Bauer said.

There is a continuing need for the formation of new Explorer posts specializing in data processing, Berg stressed. While many of the sponsoring firms have their own DP installation, this is not a necessity. Companies interested in organizing a DP post should contact Berg, at the Exploring Division, BSA, 08902.

Traveling Seminars To Cover Software Tax, Protection

NEW YORK – Software protection and taxation is the subject of a traveling seminar that starts here Nov. 8 and finishes at the Fall Joint Computer Conference Dec. 6.

In between, the seminar, sponsored by the American Management Association, will visit Chicago Nov. 13 and Atlanta Nov. 21.

The series of one-day meetings will be conducted by Lawrence A. Welke, president of International Computer Programs, Inc., and Roy N. Freed, a Boston attorney.

Welke's morning portion will stress the definition of software for tax and accounting purposes, and Freed's discussion will focus on methods of securing protection.

Freed will also conduct a three-day seminar in Chicago, Nov. 15-17, on contracting for computers and EDP support services. This meeting is also sponsored by AMA, 135 W. 50th St., 10020.

Churches Get Management Aid From Funds, Parish Profile

NEW YORK – Priests of Roman Catholic churches are being offered a computer service to guide them in administering and managing their parishes by Parish Profiles Inc.

The computer-based service offers analysis and evaluation of annual parish income and how it was raised, annual expenditures, weekly offerings, personnel policies, religious education costs, property maintenance, parishioner analysis and a survey of administration and services.

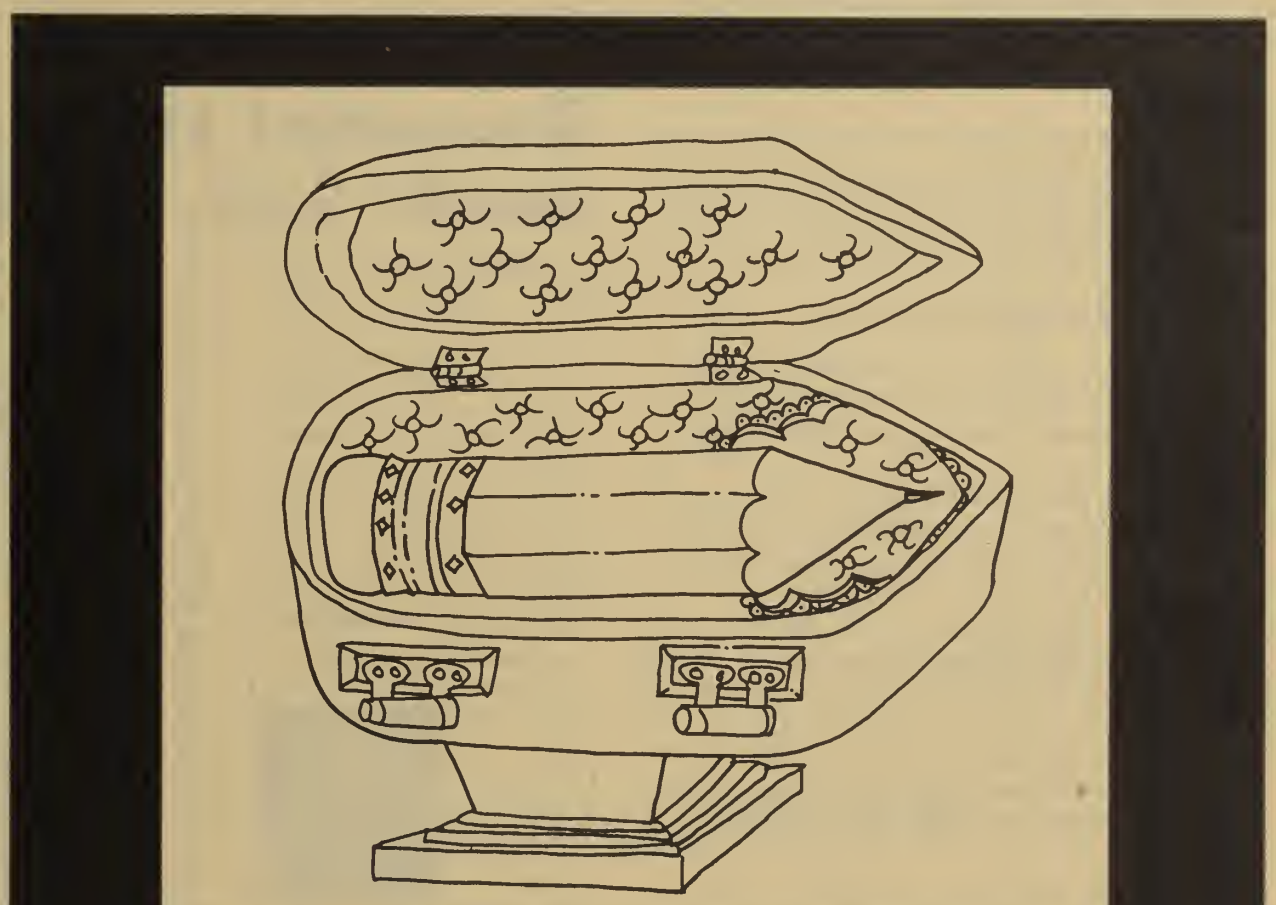
Bingo Income Studied

Included are studies of such events as weekly bingo games and their income; and communication and liaison between clergy and laity.

On subscribing, a pastor fills out a detailed form and sends it to the company, where the information is run through a data bank and analyzed by a panel of specialists. The results are then sent to another panel for recommendation.

They may suggest improving communication with parishioners to raise more money by improving the sound system in the church so more people can hear and understand the sermon.

Although this program has been tailored for use in Roman Catholic parishes, the company noted, there is no reason why the concept could not be applied to any denomination.



TMS eliminates this costly piece of computer hardware.

New TMS (Tape Management Software) does all of your record-keeping automatically.

Your operators don't have to write tape lists. There are no output labels to prepare. You don't make manual scratch records. Everything is automatic, even for no-label tapes.

At the same time, TMS has far greater abilities to help you reduce errors. It keeps track of off-site data sets, matches all your tapes against a master catalog, virtually eliminating the danger of clobbering (no matter how chaotic the workload becomes), and predicts the state of your tape library in the weeks ahead.

TMS will forecast scratch lists by data set name, job name or volume serial number.

All this was designed to protect your data while lowering your operating costs. And it does. Because it puts your people to work more efficiently, reduces the opportunity for error, and increases throughput, mainly by eliminating the most expensive piece of equipment you own.

The 5¢ pencil.

If you call me, Sterling Williams, Product Manager —Special Products at (214) 637-5010, I'll tell you more. Or mail this coupon.

Dear Mr. Williams:
Please give me more information about TMS.
☐ Send me the facts
☐ Have someone call on me
Name
Title/Company
Address
City/State/Zip
Phone

UCC
UNIVERSITY COMPUTING COMPANY
800 UCC Tower, P.O. Box 47911
Dallas, Texas 75247

Editorials

Interconnection Bogs Down

With a rare unanimity of purpose, both communications users and the data equipment manufacturers are pushing for interconnection standards that will simplify the use of independent devices.

And while the FCC appears to favor liberalized interconnection regulations, probably in the form of equipment certification, the entire question still seems mired in a continuing series of hearings and informal discussions largely dictated by AT&T.

There are now several advisory committees working to recommend proposed standards according to product type. There has yet to be a group formed to look at the data interconnection question.

Bernard Strassburg, chief of the FCC's common carrier bureau, has told Bell it must prove with supporting data that harm can indeed come to the network from uncontrolled interconnection. And if such data is not available then perhaps the question of harm is really a smokescreen from Bell to impede interconnection.

A speedy decision is needed on reasonable certification standards that will allow unlimited interconnection of independent non-carrier equipment, with adequate safeguards.

No one, user or vendor, wants to cause harm to a phone system that is vital to our very society. But a handful of telephone and state regulatory experts should not be allowed to hold back an industry from the hands of the very public they are supposed to serve.

Privacy Battle Not Lost

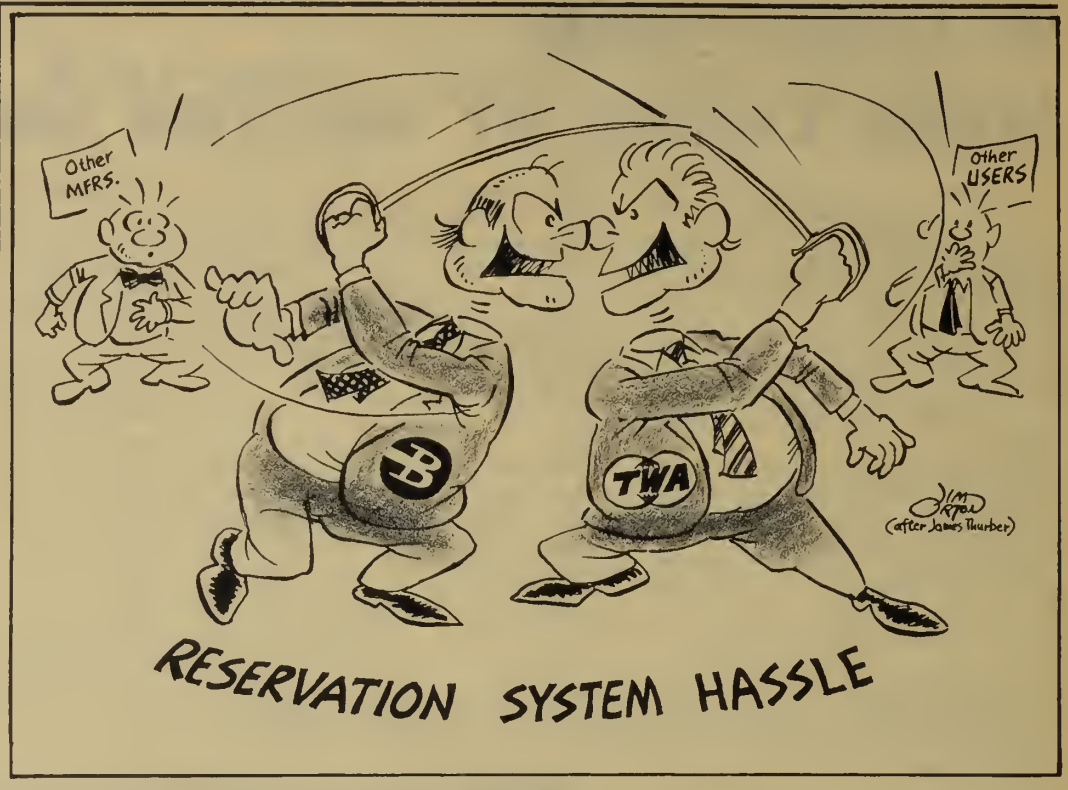
The fight to protect our privacy hasn't been lost, despite technological advances which promote data collection and storage, according to the National Academy of Sciences.

After four years of study, however, the NAS committee has decided continued pressure on legislators is needed to prevent abuses from becoming common practice.

The committee also proposed some rather radical, if advisable, moves, including stripping the FBI of its authority to control and store "rap sheets" and crime statistics.

The voluminous report, including case studies of 14 large personal data banks, should make interesting reading for civil libertarians, politicians, and computer experts.

After all the public worrying about privacy invasion, the documentation is becoming clear: the very real danger of privacy invasion and loss of individualism can be prevented, but only through constant pressure on legislators and constant airing of the issue.



'Touché!'

Management by Objectives Requires Specific Goals, Firm Commitment

Management
By Frank Greenwood, PhD

Unhappiness with the cost/benefit ratios of computer centers is widespread, and we are all compelled to become better managers. Your single most important tool to help improve your management performance is management by objectives (MBO).

MBO's main concept is that the clearer idea you have of what you want to accomplish, the better your chances of doing it. MBO has three basic steps: First, individuals determine what specific results they will produce during the planning period; second, they work to achieve these goals; and third, their performance is reviewed relative to their goals.

"Simple, I'm doing this now," you say? If you are doing it now, you know it is not simple. Indeed, compared to much of current management practice, MBO is a brand new ball game.

You may agree that a superior should maintain tight controls, require that subordinates check their plans and decisions with the boss before implementation, and solve subordinate's problems.

If you do firmly believe the above, you cannot succeed with MBO.

To succeed with MBO, you must believe most people want very much to do a good job; their work is the way most people express themselves; and they are highly committed to it. (This is in contrast to seeing people as basically lazy and to believing that a superior must, therefore, rule through fear.)

Viewing people in the positive way implies such things as:

- Subordinates need extensive freedom to plan and control their own work.
- To control his own efforts, the subordinate needs to receive timely reports on his performance.
- Superiors should insist that subordinates solve their own problems.

The three main ideas to infer from this approach are: First, individuals need to be heavily involved in defining their own jobs and expected results; second, employees need to participate in the organization's decision-making; third, individuals need autonomy so they are free to manage their own jobs.

A good way to get started with MBO is to read about it. Then, if MBO still appeals to you, start it in your own shop without waiting for something to be done elsewhere.

Begin unobtrusively with a few receptive people and in a couple of years MBO will establish itself as people see that it works.

MBO is probably most helpful in the systems and programming areas, which depend heavily on individual initiative, and is somewhat less useful in operations, where the technology allows little freedom.

As you use MBO, you will note it consists of repetitive cycles, each cycle having four parts:

- Agree with each subordinate about what areas he is responsible for
- Agree on his objectives for this particular cycle
- Then, everyone performs his job over the period of the cycle
- Last, discuss with each what results have been achieved relative to his particular objectives.

Since individuals will strive to achieve their objectives, finding the right ones and defining them properly is crucial. Try the following:

- Pick a job you know well.
- List its responsibilities (areas, not procedures or activities.
- How can you tell if each area is done properly?
- Construct a specific objective for each area.
- Now, ask about each objective: Does it measure a major part of the job? Can it be measured at the end of the cycle? Is it too ambitious? Too conservative?

Objectives should mesh and not conflict. Once approved, they should not be changed lightly.

MBO is tough on people – especially the boss. While the individual is involved in defining his objectives and, while he has autonomy to determine how to reach the objectives, he is expected to reach the objectives (or to have sound reasons for not performing as agreed). So it is not just another permissive, human relations technique.

MBO improves management. Planning is better and more use-it tends to be self-control rather than boss control.

If you want to succeed with MBO, you, the superior, must evidence your intention to manage by results. You do this by relating promotions and pay increases directly to results and by insisting that, once set, objectives are met.

Frank Greenwood is director of the University of Montana computer center.

Letters to the Editor

Cobol's Limits Don't Justify New Language

In the October 11th issue of *Computerworld,* the headline of a letter read, "Why Not Junk Cobol and Start New Language?" While I agree Cobol has many limitations and drawbacks, it would still seem totally impractical to begin again from ground zero with a new language.

The real problem in programming the typical commercial application is not Cobol's verbosity and restrictive syntax, but the fact that there is a great deal more to a successful programming development effort than just the availability of a powerful high-level language and a fast and efficient compiler.

The other critical factors to be considered are: test data must be prepared, the program must be debugged, the program must be documented, the program must be maintained, the program must follow certain prescribed installation conventions, and different types of personnel must be able to use the language.

Thus, the "ideal" language should permit test data definitions, abbreviations, macro definitions, and debugging statements, and the "ideal" compilers should generate useful debugging and maintenance information, as well as efficient object code.

Additionally, the "ideal" compilers should be able to audit the source code for inefficient statements and conformance to installation standards.

Although all of the above capabilities theoretically should be included in the standard Cobol language and compiler, they currently are available only in proprietary software packages developed by independent software houses.

The performance of such packages, working within the framework of existing Cobol, will enable Cobol to remain the preferred language at thousands of installations which have already made significant investments in Cobol programs.

In final defense of Cobol, I believe this language is fundamentally a good communication medium between systems analysts, programmers and management, and can be easily learned by the wide range of personnel found in most commercial data processing installations.

Martin A. Goetz
Vice President

Applied Data Research, Inc.
Princeton, N.J.

DP Professionalism Can Be Advanced By Alternative Means of Certification

Recently one of the smaller professional societies, the Society of Data Educators (SDE), gave $500 to the Cobol Support Fund. This was in itself an important gift, and by far the largest amount received. The fund thus could have 10 years of documents microfilmed, reviewed and indexed. It could distribute them across the U.S., so users for the first time could check the operations by which Cobol, our common language, is not kept common.

The Taylor Report
By
Alan Taylor, CDP

It was fortunate for Cobol users that someone outside the Conference on Data Systems Languages/X3 area was looking after their interests, because, as usual, things were not what they seemed.

And, this gift makes an interesting story.

It is especially interesting in light of the recent DPMA/ACM announcement on the CDP certification program.

It is interesting because the money came from the Society of Data Educators' certification program, a program quite different when compared with the DPMA/ACM efforts both in the certification and registration process and equally in the use of the income derived from the certification process.

(DPMA in the past has allocated the money to its administration area, while ACM's financial history of sudden crises makes it unlikely that any such program would survive if it were ever initiated.)

The SDE certification – the Certified Data Educator (CDE) – is given to DP teachers since the society is most directly concerned with them.

The program, started about three years ago, requires the candidate first to satisfy the examiners that he is in fact teaching DP successfully (very much as a candidate for a state registration as an engineer must show the Board of Registration that he has been a responsible engineer).

Once the applicant's performances have been established, the SDE checks out the other matters, such as his educational qualifications (if any), and his technical background, and determines what examination is necessary. The whole matter is personalized between the SDE Certification Council and the applicant.

The SDE does not use the exclusionary tactics used by both DPMA and ACM at the moment. The society believes that someone who has been successfully teaching for a year is as entitled to be recognized as a professional as someone who has been teaching for four or five years.

In fact, there are four major differences between the certification approach taken by the SDE, and that of the DPMA/ACM group. These are:

- The SDE uses one-year experience qualifications, not four-or five-year qualifications as do ACM and DPMA.
- The SDE watches over the continued professional activity of the CDE holder; it does not just abandon him with his certificate, as the CDP holder has been abandoned. (Note their lack of status in the DPMA/ACM announcement concerning the joint certification foundation.)
- The SDE listens to CDE holders and outside professionals and updates the program annually, giving reasons for the changes or lack of change.
- The SDE uses the income to assist the profession in general, and does not simply put it into the general fund, as does the DPMA.

Regarding the experience factor, it is well known that in the DP profession we can have "one-year experience repeated five times." The current five-year experience qualification for entry to the CDP exam has never been justified, and has been condemned even by the CDP holders themselves.

The fact that a man has only been in the profession three years is no reason to claim he is not qualified even to take the examination. We all know good people who are in this position. As a result, the image of the certificate itself is hurt, rather than that of the non-certificate holder.

Perhaps sometime it may be shown that long service is necessary. But until then I think the SDE approach is by far the better one, and I support it.

Keeping Up to Date

Of these four areas I think the most important concerns watching over the continued professional activity of the certificate holder. DPMA does little to ensure the certificate holders are current, and probably feels it would not be practical to do anything, after making an applicant wait around for five years before letting him even sit for the examination.

The SDE, in contrast, has insisted that CDE holders at least subscribe to the *Journal of Data Education* in order to expose them to the changes in DP education. In the future, Dr. Enoch Haga of the SDE told me, considerably greater requirements of keeping up to date are likely.

Annual Review

These changes are planned, partly because of the annual review of criticisms from CDE holders and outside professionals. When the 1972 review was held in August, the problem of the out-of-date certificate holders came up, and also the problem of the irresponsible certificate holder. Haga, on behalf of the SDE, agreed both were real problems, and improvements were necessary. Proposals for possible improvements are due in December, and will be open for general criticism before being instituted.

This SDE method of maintaining and improving certificate quality is much superior to the DPMA/ACM use of handpicked committees, and issuing edicts as though they were from old Greek gods on Mt. Olympus!

One-Year Qualifications

The use of the shorter (one-year) qualification method is more realistic and also permits the strengthening of the continued updating of certificate holders. The four- and five-year waits for DPMA approval to take the CDP exam, or for entry into ACM membership make it impractical for the examination authorities to have an effective "update" clause.

Moreover, with the short period involved in the CDE wait it is possible to question why anyone claiming to be a professional teacher does not have some qualification like the CDE. That type of recognition simply is not possible with the long waits used by DPMA and ACM.

Use of Money

The use of the money, for professional as opposed to society purposes, is potentially the most important area of all. The income from the CDP program is not used for professional purposes, but is put into the general DPMA pot.

(Recently, when DPMA found itself short on its other activities it simply increased the administration allocation that the certification program had to bear, and reduced the cost of its conference accordingly!)

ACM's financial history is so frought with crises that the profession can not expect any less cavalier treatment of certification funds in the future either.

And yet, certification funds could greatly help the profession. Many of the excuses as to why things are not being done – such as providing copies of the Codasyl meetings – are based on the pretense of the lack of funds. A few dollars available to the profession for professional activity could change all that.

In fact, the CDE program which has allowed the SDE to give $500 to the Cobol Support Fund, may well have been the catalyst for real professional advancement we have been awaiting for years. And certification may be the key issue for future professional responsibility.

For these reasons I support the Society of Data Educators and its approach to certification. If you are a DP teacher, or interested in the subject, I suggest you consider both joining the society – and telling the rest of us that you care by having yourselves certified. A coupon for your use is provided.

© Copyright 1972 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of *Computerworld*.

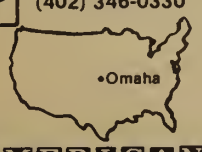
Interested in SDE, CDE?

To: The Society of Data Educators
Gentlemen:
☐ I wish to join the society. ($12/yr.)
☐ I want details on the CDE certification program.

Name _____
Address _____
Title _____

When completed please send to The Society of Data Educators, Route 2/76, Northfield, Vt. 05663.

VOLUME KEY PUNCHING
(402) 346-0330



AMERICANA KEY PUNCH
Redick Tower
Omaha, Nebraska 68102

THROUGHPUT

ARE YOU GETTING ALL YOU DESERVE?

THESE PRODUCTS FROM BOOTHE MANAGEMENT SYSTEMS CAN HELP YOU ANSWER THIS QUESTION WITH A POSITIVE "YES"

SPOOLER
SPOOLER provides an economic printer output spooling routine for DOS installations. It allows the printing of output to be independent of the generation of the output. The technique employed by the SPOOLER is to write the output onto disk as it is being generated, then write from disk to printer as the printer becomes free – performing all of its functions in a partition as small as 4K.

BCCXREF
BCCXREF will reduce by over 50% CPU usage for the generation of the CROSS REFERENCE listing provided by ANS COBOL. BCCXREF will significantly reduce elapsed time in the compiler partition or region, increase throughput, and allow greater system usage for other purposes.

DOSRELO
DOSRELO provides a method of making DOS problem programs self-relocating. DOSRELO accomplishes the self-relocation capability for all programs, regardless of the language, by adding entry point logic to the object code of the program before the Linkage Editor catalogs it on the Core Image Library.

CIMS
The Computer Installation Management System (CIMS) provides a method to supply management with pertinent information in the utilization of their data processing hardware. CIMS accepts data collected by the System Management Facility (SMF), formats the data and presents the data in varying sequences and formats. Reports for job accounting, multiprogramming throughput, hardware analysis, and others are provided.

Immediately available for your free trial use with no obligation, of course.

GET ALL YOU DESERVE!
write or call
BOOTHE MANAGEMENT SYSTEMS
A DIVISION OF BOOTHE COMPUTER CORPORATION
555 California St. • San Francisco, CA 94104 • Tel. 415/989-6580

Accepted by Banks, Aerospace, Oil, Universities, Accounting, and many other firms.

OUR NEW ON-LINE PROGRAM DEBUGGER LET'S YOU FIND BUGS FAST AND FIX THEM QUICK– IN ANY LANGUAGE YOU CHOOSE.

Our Integrated Symbolic Debugger (ISD) is a new way to debug programs. It *automatically* finds errors, pinpoints their locations, and enables you to make immediate "temporary" fixes. In your own programming language – whether it's ANS COBOL, COBOL F, Fortran IV G, Assembler F or Assembler H.

ISD cuts debugging time in half. Why? No more painstaking searches for errors. No more correcting the source code, recompiling, reexecuting for every bug found. No more "dead time" waiting for new listings.

ISD lets you display and correct all your bugs in one pass, so you recompile and reexecute only once.

To help you find errors, ISD has these unique features:

- ☐ **Data examination.** You can display any part of a program at any time for examination, analysis or modification.
- ☐ **Data tracing.** You can automatically pinpoint modifications of any program variable, and the statements that caused the modification.
- ☐ **Statement tracing.** You can track the sequence of executed source statements to find errors in logic.
- ☐ **Label tracing.** You can speed program examination by following execution of labelled statements.
- ☐ **Error notification.** If your program stops, ISD automatically tells you where it stopped and why it stopped, in symbolic language.

And when it's time to fix the bug, ISD gives you these tools:

- ☐ **Program patching.** You can quickly insert temporary lines of code in the program's source language during execution.
- ☐ **Immediate execution.** You can continue to execute immediately after inserting the temporary code.
- ☐ **Unlimited alterations.** ISD will enable you to continue execution regardless of the number or type of patches. You can alter both data and logic and run those alterations immediately.

ISD is inexpensive and simple to use. It's available all day through your terminal – in the language you now work with – at a cost of about $35 per hour. And when you buy ISD, you buy the training, service, and 360/67 systems of Interactive Data Corporation, one of the world's best suppliers of time-sharing services.

ISD: It Gets Rid Of The Bugs

Interactive Data Corporation
486 Totten Pond Road Waltham, Mass. 02154

Please send me more information about your new Integrated Symbolic Debugger (ISD).

Name:_____

Title:_____

Company:_____

Street:_____

City:_____

State:_____ Zip:_____

☐ Also send me a reproduction of the cartoon illustration of the program debugger's creed.

Universal Product Code Expected For Grocery Operation by March

NEW ORLEANS – Current efforts to automate the supermarket will drastically alter the operations of many grocery stores. The industry has been developing a Universal Product Code for supermarket items and the numbering scheme will be adopted by March 1973, according to Lawrence Russell, systems analyst for McKinsey and Co.

Several tests using computerized checkout systems are already underway, Russell said. The computerized systems put the entire checkout operation under the control of a minicomputer. The mini gets data on the items being checked out via optical scanning systems that sense specially coded symbols.

Although there is tentative agreement within the industry on the use of a 10-digit product code, the coded symbols and the scanning systems are still incompatible with each other, Russell noted.

The industry goal is to have an up-to-date record of all supermarket transactions, Russell said, and the store manager can thus keep close watch on his inventories, and generally improve the efficiency of store operations.

The store manager will no longer be a former "order bagger" who has come up through the ranks, noted Robert Grottke of Arthur Anderson & Co. Instead he will have to be highly trained to understand the computer controlling his store, and he will also have to understand the economics of supermarket marketing, Grottke said.

Since it will be impossible for store management to assimilate all the data collected by the mini, the manager will have to rely on exception reporting to spot new trends or signal when problems arise, Grottke stated.

Among the benefits that will come from mini-controlled markets are better scheduling of personnel and a better understanding of productivity rates. By including timing devices on the minis, the manager will know how fast individual workers are checking out the customers, Grottke said.

Big Problem

In addition to establishing industry identification standards, the biggest problem still impeding the automated checkout is the telecommunications area, according to Mike Lovokove, vice-president of marketing for Pitney Bowes-Alpex. The hardware is available now but it is still a problem for management to connect several stores via phone lines, he said.

Tests have already been held both here and in Europe, using specially marked and scannable grocery items, Russell said. In most of the tests, the customer cooperated by aligning the grocery products so they could be detected by the scanning system, he said.

It will take the average supermarket at least a year to convert to a computer-controlled operation, Russell said.

Computer-Aided Architecture Design Called Academic, a Myth

By Joseph Hanlon
Special to Computerworld

YORK, England – Computer-aided architectural design is still primarily a myth, but when it becomes a reality it will produce dehumanizing buildings, according to one of the foremost experts in the field.

Prof. L. Bruce Archer, head of the computer-aided architectural design (Caad) unit at the Royal College of Art, London, expressed these opinions in a paper at the International Conference on Computers in Architecture here.

"Very few of the packages described in the literature are real, or available, in the sense that any architect has much prospect of being able to design a real building with them in their present or currently planned state of development. Most are academic, in the sense that they are calculated mainly to advance knowledge, rather than do practical design," Archer declared.

Analysis of the conference papers bears out Archer's contention; there are only one or two examples of systems that even approach the ideal of an architect sitting at a CRT and having the computer as an aid for the entire design process, and these are both expensive and usable only in very special circumstances.

For the most part, what is available consists of computational packages unrelated to one another and thus require different input formats and different computers.

Predicts Protest

Archer is primarily concerned with the qualitative aspects of the buildings that will be built with Caad systems when they become available.

Despite the fact that he is a strong proponent of Caad, he declared: "I am reluctantly compelled to conclude that under present conditions Caad does *not* permit the architect to improve his performance in the handling of the qualitative.

"Moreover, I suspect that unless something specific is done to prevent it, when the first generation of Caad buildings is exposed before the critical gaze of the noncommitted public, the occasion could be the signal for another outburst, more or less justified, of accusations of a further dehumanizing of the built environment."

Advocates of Caad argue that the computer can take many of the quantitative chores from the architect and permit him to spend more time and energy on the qualitative issues.

But Archer predicts that economic and timetable pressures will instead prevent the architect from using this extra time for qualitative considerations.

In particular, "where the computer actually 'optimizes' the design under given constraints, the architect may be at some disadvantage when trying to modify the design in light of other, subjective considerations. Human nature being what it is, for much of the time he is likely to let things be," Archer warned.

"Direct evidence is hard to come by," he conceded. "There does not seem to be in the literature a single case of measurement being made of the proportion of time spent by an architect on qualitative considerations.

"Where comparative studies have been made of projects conducted with and without computer aids, there is nothing to show whether in these cases the architect was able to devote more effort or less to the qualitative side."

Professional Pressure

The answer, Archer noted, is that the architecture profession "should apply ethical controls to ensure that under no circumstances will the introduction of Caad be allowed to reduce the amounts of time, money and effort which an architect is able to spend in dealing with the qualitative aspects of his design, or to prevent him from overriding and modifying machine-generated designs where his professional judgment demands this."

SOFTWARE&SERVICES

Random Notes

Package Adds A/D Control To Vortex-Driven 620 Mini

IRVINE, Calif. – Digital/analog input and output can now be handled in real-time applications on Varian 620/f and 73 computer systems, with the Process I/O package from Varian. Intended for use under the Vortex operating system, Process I/O supports random or sequentially scanned input from analog and digital sources.

The programmer can address individual input lines by standard Fortran I/O commands, and special enhancements are said to let him manipulate individual bits within a Fortran variable. The package is supplied free to all Vortex users, a Varian spokesman said.

'Brandaid' Service Supports Market Planning, Forecasting

WESTON, Mass. – Brandaid on-line modeling service, developed by Management Decision Systems Inc. and available on either the National CSS or Interactive Data Corp. networks, allows an operating manager to combine actual data with his own judgment to study the effect of various marketing strategies.

Working in normal English, the user can do forecasting as well as brand planning.

MDS provides approximately four months of installation support, for $10,000 to $15,000, after which Brandaid can be used for no more than normal time-sharing charges, a company spokesman said from Riverside Office Park, 02193.

Search Service Shows Articles Linking DP Use in Construction

BOSTON – The Bibliography of the Computer in the Construction Industry, compiled by the Center for Environmental Research, provides current listings of literature relevant to the use of DP in architecture, building, planning and engineering.

It is available on a subscription basis, as an 800-page, two-volume publication, updated monthly, for $110/yr; or as a search service, for which the center charges $5 for each search, plus an item charge for each entry located. This charge drops as the number of items listed increases, the center noted, from 955 Park Square Bldg., 02116.

National CSS Opens D.C. Office

ARLINGTON, Va. – National CSS Inc. has opened a data communications facility here to provide users with access to the company's 360/67s in Stamford, Conn.

The new office, at 1701 North Ft. Myer Drive, 22209, is equipped with a Data 100 Model 70 terminal and multiple low-speed teletypewriter units.

Grasp Developer Warns:

VS No Help to DOS Batch Operations

By Don Leavitt
of the CW Staff

BURLINGAME, Calif. – DOS/VS is going to be a real advance on DOS for the 370 user, but unplanned or ill-considered use of DOS/VS will "certainly be far more damaging" than unplanned use of DOS, according to Boyd Munro of Software Design Inc.

Munro is the original developer of the Grasp DOS enhancement package and probably knows the concepts behind DOS as well as anyone outside of IBM.

DOS/VS offers, in technical terms, the possibility of exchanging processing speed for storage capacity, Munro explained. In some cases this exchange will be of great value to users, but in other cases it would be "sheer disaster," he added.

As various other industry sources have noted, Munro points to on-line teleprocessing systems – that use a lot of storage, but little CPU time – as ideal applications for virtual storage.

The savings in storage required will more than offset the increase in processing time and the reduction in net cost will, it is hoped, justify applications which cannot now be justified, Munro explained.

Batch Performance Poor

But the savings possible in normal batch work – the workload that has always typified the DOS user – will be limited, in Munro's view. The performance loss will generally far more than offset the storage saved, and the only practical advantage of VS will be the ability to handle one or two large jobs which take very little time but have forced the addition of extra storage on a "real" machine.

The potential degradation is "enormous" and since it will be "extremely difficult" to discontinue the use of VS once started, the new software control system "should sell real storage on a massive scale."

It will do so, Munro said, because the need for additional real storage doesn't become apparent to the VS user until it is too late to make another choice.

The user operating in a "real" environment knows he can't run a program that won't fit in his partitions. He will go through a lot of work to make the program fit, and will be aware of the time when he finally must get more core.

With VS, the break-point isn't so definitive. If a single program doesn't fit in available real storage, it is paged in and out with only minor slowdown in processing. As more programs overflow the capacity of real storage, however, the degradation becomes worse.

Tab May Outperform 145

Eventually, however, paging may become the prime operation, and then the system begins to run "like a sick camel." Munro is pessimistic about when this will happen: "If just 1% of instructions requires a page-in, page-out operation," he said, "effective throughput will drop by about 99% and a 370/145, for example, will be outperformed by a tabulating machine."

With DOS/VS, by the time the user senses the possibility of needing more core – to expand his "page pool" area – he will be faced, as an alternate, with having to modify not just one but "twenty" problem programs to make them smaller, or less prone to paging.

The magnitude of such a reprogramming task is such that it is not a real alternate at all, Munro said.

User Shapes Separate Modules In Unified Accounting System

LOS ANGELES – Users may gain the economy of packaged software and the satisfaction of having applications run the way they want, with parameter-written management and financial systems from Pyramid Industries.

The applications include order entry, sales, inventory, product and profit planning. Also available are general ledger, accounts receivable and accounts payable, fixed assets accounting, payroll/personnel and job cost modules.

The billing and inventory system includes pricing of products and orders using each client's criteria, supporting control of multiple warehouse locations and monitoring of back orders.

In addition to all the paperwork needed to document an order, the system provides sales analysis by product and customer, Pyramid said.

The accounts receivable application gives the user a choice of balance forward or open item processing. Aging periods are adaptable to each user, and aged balances or dunning notices can be printed directly on the monthly statement.

The general ledger and budget control modules allow both divisionalized and summarized balance sheets and income statements, as well as the ability to report on more than one fiscal year period.

The user may utilize his own chart of accounts and budgets can be established by operating departments or by ledger accounts for each month of the year.

The payroll and personnel status programs handle a broad spectrum of salary plans, including employees paid out of multiple states or cities, and an equally useful range of deduction options.

In addition to conventional output, including federal and state forms, this package includes a report generator.

The fixed assets routine also includes the report generator so the user can extract the data he wants as he wants it. The program logic supports multiple depreciation methods, including separate methods for tax and book values, if desired.

Flexible Module

The job cost module is said to provide a high degree of flexibility in reporting costs related to budget, including both dollars and hours if required.

The applications are written in ANS Cobol and run in a 65K DOS partition with one disk drive for an Isam file and four tape units. The software costs from $3,000 for a single application, to $30,000 for the complete system.

Pyramid is at 10801 National Blvd., 90064

Routine 'Translates' OS Dumps

ANAHEIM, Calif. – Programmers working in OS/MVT environments should now read core dumps more easily, and therefore get more quickly to their debugging efforts, with the "readable abend dump package," G92638, now available from M.A. Pilkerton Co.

The package adds to the printout produced by OS when a job aborts, to make it more comprehensible. But the new coding supplements, rather than replaces, any IBM coding so users should have no maintenance conflicts in case of software failure, Pilkerton said.

In addition to all the material normally "dumped" when a program fails, G92638 inserts English language keys showing "this data set is [input/output]" and printing the file data in alphanumeric characters rather than hexidecimal digits.

Other insertions tell the user that "volume serial number is . . . and "sense switch settings are . . . ." The program status words are identified and the addresses of the instruction that aborted the job "translated" into an easily used pointer to the trouble spot.

The package is a transient routine triggered by a supervisor CALL inserted between two standard IBM-initiated CALLs.

Designed for use under OS/MVT, the package can be altered for use in an MFT environment. It is available in both source and object code, for $195.

M.A. Pilkerton Co. can be reached through P.O. Box 6372, 92806.

Nobody Schedules Multiprogramming the Maximum Advantage Way... Except Our Customers

Scheduling Tools for
OS/MFT and VS1
OS/MVT and VS2
DOS and DOS/VS

Value Computing's customers have a tool, our Scheduling System, in the hands of their schedulers that pays off big. With Value Computing, schedulers don't just schedule, they also optimize the loading and balance of the entire computer system. Benefits frequently experienced are:

- productivity increases of 20-40%
- savings of hundreds of thousands of dollars
- improved operational control
- better service to customers
- a new ability to plan ahead
- new tools for measuring people and system productivity
- lots more

If you want these benefits, you have a responsibility to fill out and mail this Value-able coupon.

value computing inc.

Value Computing Inc.
496 Kings Highway North
Cherry Hill, New Jersey 08034

Value Computing Inc.
496 Kings Highway North
Cherry Hill, New Jersey 08034
I'm interested in More Details:
☐ About Your Computer Scheduling Systems
☐ Have a Salesman Call
☐ I Don't Believe You, But I'll Listen

Name _____
Title _____
Company _____
Address _____ ZIP _____
Telephone _____

Everybody promises to save you money on your data communications line costs.

If you can answer yes to one question, we will probably guarantee a minimum of 20% savings on your Data Communications line cost, and if our experience is a guide, that percentage will be a lot higher.

These are the questions.

Do you now rent three or more separate low speed private data-grade lines from a phone company?

Do you now rent three or more low to medium speed phone company data sets for remote terminal dial access from the same general area?

Do you now rent a single low speed data channel to a remote location that also requires a higher speed data channel for remote job entry?

Do you plan to convert to on-line data entry from three or more intrastate locations?

If your answer is yes to any one question, we can save you money. We can assemble a DataPak Communications System to guarantee at least that 20%. And probably more. We'll use our Dataplan Computer analysis to come up with the best configuration to meet your needs, furnish the equipment, install it, maintain it, and save you money. **Guaranteed.**

In addition, we'll make you a *second* guarantee. Your Data Pak equipment will pay for itself in 18 months. And it's likely to be way less than that. Don't be surprised if your annual savings come to $30,000 or more.

To get us both started on your Dataplan, please write or call Mr. James Corless, Data Products, Stelma Telecommunications, Stamford, Conn. 06902. (203) 325-4161.

we guarantee it. At least 20%, even for 3-line systems.

We put our reputation on the line.

DATA PRODUCTS
stelma telecommunications

For more information write: Jim Corless, Data Products, Stelma Telecommunications, 17 Amelia Place, Stamford, Conn. 06902

Name
Company
Title
Street
City State Zip

'Keycheck' Monitors Data Entry Operator Cost-Effectiveness

CAMBRIDGE, Mass. – Managers of keypunch, key-tape or other data-entry facilities can have day-to-day financial and cost effectiveness profiles of their operations, with the Keycheck software from National Information Services Inc. (NIS).

The system is available as a package for installation on the user's own CPU or as a service run by NIS. Either way, Keycheck provides more statistics and related pricing output than the user can get elsewhere, the company claimed.

Various key-entry units accumulate operator data, but even the reports generated by shared processor key-disk systems are said to be incomplete and hard to interpret compared to Keycheck's documentation.

Throughput Analyses

The NIS system generates 11 separate reports, including analyses of production throughput and cost effectiveness of each operator and machine. The system measures job quality by error rates, does cost accounting by project and creates an historical data base for future job pricing.

It can prepare job invoices, for presentation to outside clients of the using data-entry facility or for inter-departmental assignment of costs actually incurred by the data-entry section.

The historic file, including both costs and brief definition of job type, enables the system to generate current estimates of what prices should be charged for proposed projects. The program can also compute the ratios of equipment rentals to revenues, or of revenues to direct labor costs, so the level of facility profitability can be determined.

The package can handle any facility with up to 500 operators and 500 machines, but is said to be feasible for key-entry operations with no more than 10 machines.

Written in Fortran IV, Keycheck may be used on any IBM 360/370 with a 100K-byte partition. It can be purchased for $2,500, or used on a service basis with costs dependent on number of user production hours to be reported and analyzed.

NIS is at 675 Massachusetts Ave., 02139

32K IBM, Univac CPUs Run 'Miracl' Cobol Generator

ARLINGTON, Mass. – The Miracl Cobol preprocessor package, originally developed by Republic Software Products Inc. of East Orange, N.J., is now being marketed by PHI Computer Services Inc., 800 Massachusetts Ave., 02174.

Miracl generates Cobol source code in any of a number of "dialects" from input statements written in a near-English language. Output can be IBM Cobol Level D, F or U, or Cobols for Series 70, ICL, Univac or Honeywell. The package runs on 32K IBM 360/370, Series 70 or Univac 9000 CPUs and costs $15,000.

AUXCO project management system

Developed with Eleven Major Corporations

Design Criteria
- Comprehensive—handles all types and sizes of projects
- Flexible—dictionaries adapted to each organization
- Easy To Use—computer turnaround documents

System Functions
- Planning
  Predetermined Work Definitions
  Standard Estimating Guidelines
  Budgeting
  Scheduling
  Network Analysis
- Control
  Responsibility Level Reporting
  Project Status—Projected Completion
  Trouble Analysis
  Attendance Reporting
  Personnel Inventory
- Analysis
  Client and Department Costs
  Staff Performance
  Trouble Areas
  Estimating Guideline Efficiency

Support
- Installation
- 42 Days On-Site
- Training

For Information Call: **AUXTON COMPUTER ENTERPRISES, INCORPORATED** 1345 Avenue of the Americas, New York, New York 10019 • (212) 489-7620

Data Briefs

Data Code Converter Handles Baudot/Ascii

SANTA CLARA, Calif. – A data-code converter designed to transform 5-level Baudot characters to 8-level Ascii format has been introduced by Pacific Plantronics, Inc. The Model 703 Code Converter is supplied by the company's subsidiary, Frederic Electronics Corp.

The unit allows existing Baudot terminal equipment to be compatible with Ascii computer systems. The 703 has programmable input and output speeds from 37.5 to 2,400 bit/sec to match the user's communication speeds, the firm said.

The unit uses an integrated circuit read-only memory (ROM) to perform the character conversion on a one-to-one basis.

The 703 costs about $600 depending on configuration, the company said. It is available in 30 days from Pacific Plantronics, 385 Reed St., 95050.

Data Monitor Prints Record

CHERRY HILL, N.J. – On-line data-transmission monitoring at up to 9,600 bit/sec is available from Spectron Corp. via the Universal Monitor. The unit provides a hard-copy record of every character sent – control or text – on a data channel. Compatible with any 5- to 8-level code and synchronous or start/stop systems, the monitor has been redesigned to copy any speed up to 9,600 bit/sec.

Its former upper limit was 7,200 bit/sec. The monitor costs $9,500 or $323/mo. on a three-year lease.

Spectron is at 1060 Kings Highway N., 08034.

ICC Cuts Modem Prices

MIAMI – International Communications Corp. has reduced prices on its 4,800, 7,200, and 9,600 bit/sec modems. The reductions range from 2% to 17% on purchases and 14% to 50% on lease prices.

The largest cuts were applied to data sets in the 4,800 bit/sec range, while smaller reductions were announced at the other speeds, a spokesman said.

Delta Adds Displays

CORNWELLS HEIGHTS, Pa. – Delta Data Systems Corp. has added the Delta 5000 Series to its display terminal line. The 5000 series has a programmable keyboard which can be modified to fit the user's application, the company said.

A single keystroke can generate messages or instructions up to 95 characters in length. The series includes the 5100, 5200 and 5300 for multidrop networks.

The 5000 Series starts at $3,000 depending on configuration. The firm is at Woodhaven Industrial Park, 19020.

At DUA, ATT Told:

Survey Users' Illegal Interconnections

By Ronald A. Frank
Of the CW Staff

NEW ORLEANS – It is possible that illegal interconnections to the telephone network now number in the "several millions" but the Bell System has not yet devised a program to obtain such data, according to Bernard Strassburg, chief of the Federal Communications Commission's Common Carrier Bureau.

Speaking to the Digitronics Users Association (DUA) at its seventh annual meeting here, Strassburg called on AT&T to "undertake an objective survey to determine the extent of illegal interconnection and the incidence and character of actual as opposed to theoretical harm" to the telephone network.

Bell's Obligations

Reviewing Bell's claims that protection of the network requires the use of currently tariffed connecting arrangements to prevent harm, Strassburg said Bell "is obligated to supply the necessary data or abandon its dogmatic position that interconnection requires standards and procedures of the utmost vigor."

But the FCC bureau chief cautioned that subscribers "have a duty to conform to applicable tariff conditions . . . or run the risk of losing their service," regardless of whether the tariff is unfair or economically burdensome. In this regard he called on the telephone companies "to police and enforce compliance with their tariffs.

Also addressing the subject of possible harm to the network, AT&T's assistant vice-president for computer communications and data services, Theodore Simis, told the DUA it is "quite possible that service can be adversely affected without causing actual harm to the network."

A great increase in customer-owned equipment could lead to a loss of equipment revenues for the Bell System, Simis said. This may increase the revenue requirement needed from other basic services, he added.

The resolution of current interconnection problems was closely tied to costs by most speakers at the DUA conference. A certification program could lessen the availability of independent equipment because of the costs of having such devices certified, Simis said.

A liberalized interconnection policy together with competition from the new specialized carriers would result in a loss of business and profits to the established carriers, according to Francis Riordan, president of the National Association of Regulatory Utility Commissioners (Naruc).

And such a "major cut in profits . . ." would result in "yet higher rates to residential users to make up the difference," Riordan claimed. This is why Naruc is challenging in the courts the FCC decision that allowed the entry of the new specialized carriers, he added.

CW Photos by Ronald A. Frank

AT&T's Simis
. . . actual harm

FCC's Strassburg
. . . in harm's way

As if to answer Riordan's statements, Kenneth Cox, senior vice-president of Microwave Communications Inc., told the conference that Bell will never be adversely affected by the specialized carriers. "We will not lap up all the cream," Cox said. "We will not block development of [Bell's] new high-capacity facilities." And the specialized carriers will not cause a shift to higher rates for intrastate telephone subscribers, Cox said.

The FCC should redouble its efforts to wind up current interconnection proceedings and evolve a final policy, Cox noted. "Users clearly have a stake in the outcome of these proceedings and . . . should participate to the maximum extent possible," Cox said.

He praised the National Retail Merchants Association for playing a "significant part" in some FCC proceedings and said individual users should do the same.

"You should not just encourage new terminals and new common carriers, but you should align yourself with them in regulatory proceedings," Cox told the attending users.

And Ralph Berglund, president of Berglund Associates Inc., observed: "The progress [made in resolving the issues of] interconnection is distinctly disappointing, if not shameful." Many of the issues that faced users four years ago are still pending before the regulatory commissions, Berglund said.

Data Test Centers And LSI Modems Planned by AT&T

NEW ORLEANS – AT&T will introduce two new LSI modems within the next year, according to Theodore Simis, vice-president for computer communications and data services, who spoke at the Digitronics Users Association conference.

The new models, which will operate at 2,400 bit/sec and 9,600 bit/sec, are now undergoing final tests, Simis said. Although not mentioned in his speech, it is believed the slower speed unit will be designated the 201C, while the 9,600 bit/sec unit will be called the 209 data set.

New Test Center

Bell's new automatic data test center in Dallas was also described by Simis. He said the center "can test up to 100,000 data terminals under control of a centralized computer at a fraction of the time it used to take to do the job manually."

The Dallas center is known to be a prototype site for similar terminal test centers being planned by the Bell System. The major capabilities of these test centers will be to isolate the data sets and modems from the user's telephone circuit to speed trouble shooting.

Although these centers initially will test only sites with Bell data sets, they may later be used to isolate faults at user sites with Data Access Arrangements (DAAs) and independent modems. At such installations the testing would be done up to the DAA, which is controlled by Bell and has an automatic built-in test capability, according to AT&T.

The Dallas center is presently using a PDP-11 mini and performing a limited amount of testing, using software developed by Bell Laboratories. This operation is considered preliminary in nature and larger CPUs will have to be used as more sites are tested, a spokesman said.

When AT&T upgrades the capacity of the Dallas test center and adds other centers, it will be possible for the Bell operating companies to respond to a trouble call from data users with relatively quick on-line diagnostics.

AT&T will soon file an "initial construction application" with the FCC for the first stages of its Digital Data System, Simis told the conference attendees. The applications will cover facilities to provide "two-point service between five cities which should be in service by mid 1974," Simis said. The locations include Boston, New York, Philadelphia, Chicago and Washington, D.C., he said.

NOW-TALCOTT'S
TWO HOT TO NOT HANDLE.

1. 370 systems leasing
2. 360 systems leasing

Talcott offers you both – at SIGNIFICANT SAVINGS.

5-year 370 leases/short-term 360 leases/professional service includes technically proficient salesmen, field and systems engineering personnel, performance monitoring/financial reliability—we're one of the country's oldest (118 years) and strongest ($700 million in assets) independent financial organizations/get to know us—now.
Call or write:
CHARLES DIEGES, 1290 Avenue of the Americas, New York, New York 10019, (212) 956-2858
WILL FOSS, 230 West Monroe Street, Chicago, Ill. 60606, (312) 782-9044
MILT KIRBY, 1600 First National Bank Tower, Atlanta, Ga. 30303, (404) 524-6961

Talcott
TALCOTT COMPUTER LEASING
Division of James Talcott Inc. • Founded 1854
1290 Avenue of the Americas, New York, N.Y. 10019
Member Computer Lessors Association

MEDIUM, WELL DONE.

By now, you should expect it.

When Data General goes to work with a new medium, we do it well.

Our new Nova Cassette is the most innovative and reliable on the market.

Essentially, we've solved a lot of the reliability problems that have plagued cassettes in the past by relying on electronics, not mechanical systems, to handle the hairy jobs.

Most cassettes have a complicated system of capstans and pinch rollers to move the tape past the heads at constant speed.

The Nova Cassette uses read/write electronics smart enough to disregard variations in tape speed. It's a simpler, less expensive, much more reliable solution.

Similarly, we finessed the tricky tape guidance problem by recording data on one track across the whole width of the tape, and reading from only the inner 80% of the tape.

A little skew (or a little edge wear, or a little dust) just doesn't get in the way. And you can write on one Nova Cassette transport and read on another. Reliably.

We use a read-after-write head configuration that automatically verifies the data you're writing, without backtracking and reading over. That saves your tape and your time.

Average capacity is 100,000 bytes per cassette. Data transfers at 1660 bytes per second (through Direct Memory Access channel, so it doesn't have to interrupt the processor). Average speed is 30 inches per second. One, two, or three transports, power supply, and drive electronics fit in 7 inches vertical. A control for eight transports mounts on one p.c. board.

One drive is $2,000. The second and third are $750 each. A control for eight is $1,500. Software is free.

If you're an OEM, take up to 40% off everything.

When Data General does a job, we do it well.

These days, that's rare.

DATA GENERAL
Southboro, Massachusetts 01772

Bits & Pieces

Univac 418 Users Can Interface IBM Disks

IRVINE, Calif. – Univac 418 II users can interface their systems to IBM 2311- or 2314-compatible disk drives with a DC-36 Disk Controller from Telefile Computer Products.

The DC-36 connects to the 418's parallel I/O channels to control up to eight disk drives. All disks are powered by the controller.

The controller translates all disk-originated commands and provides eight 36-bit words of buffering and signal timing for disk/core data transmission, monitors the status of each disk drive and controls data transfers.

Delivery is 60 days.

Prices start at $17,000, depending on quantity and options, from 17785 Sky Park Circle, 92664.

Paper Has New Source

MAHWAH, N.J. – Western Union Data Services will market paper rolls, fanfold forms and paper tape for Teletype Model 33s and 35s, GE Terminet Series and other teleprinters.

Carbonless paper rolls are available up to seven plies thick with prices starting at $13.16/carton.

Fanfold paper, utilized by terminals having pin-feed, is available in 8-1/2 in. and 12-27/32 in. widths by 11 in. forms. Fanfold forms are packaged 3,000 sheets to a carton at starting prices of $8.75.

Orders can be placed through a local Data Services salesman or from the firm at 16 McKee Drive, 07430.

New Technique Cuts Transport Price

PLAINVIEW, N.Y. – Infotec is offering end users and OEM customers new magnetic tape transports (TDX Series) with speeds up to 75 in./sec at a cost under $3,500.

Presently, units with the same capabilities claimed by Infotec cost between $4,200 and $6,000.

The TDX's cost is made possible through a new tape path and balanced capstan drive system which eliminate the vacuum column and tension arms previously required, according to the firm.

The TDX Series offers 35, 37.5, 45 and 75 in./sec speeds in the same housing.

Delivery is 60 to 90 days from 70 Newtown Road, 11803.

Cash Registers Get Two Options

SAN LEANDRO, Calif. – Singer Co. has two new peripherals for its computerized cash registers.

The Transportable Cassette Recorder Model 825 records transactions on small magnetic cassettes for future mailing to a computer facility. The Transportable Cassette Converter Model 835 accepts cassettes from the TCR 825 and rewrites the data on 1/2-in. magnetic tape in either Usascii or Ebcdic.

The TCR 825 costs $1,400 and the TCC 835 $15,000. Delivery for both units is 90 days from 2350 Washington Ave., 94577.

Keane Adds Option to S/4

WELLESLEY HILLS, Mass. – Keane Associates, Inc. has added a low-speed terminal communications option to its System/4 desk-top comptuer system which permits users of the System/4 to communicate over telephone lines from one System/4 to another, or to a teletypewriter or any other terminal device with a similar capability, according to the firm.

Price for the option is $24.50/mo over and above the basic rental of the System/4 processor, which starts at $200/mo, from 36 Washington St., 02181.

Rents for $2,000/Mo

IBM OCR Unit Aimed at Small Users

WHITE PLAINS – IBM's announcement of a new low-cost optical character reader further supports the views of many users that optical character recognition will become the data-entry media of the seventies.

Renting for around $2,000/mo the Model 3886 is priced as an entry-level machine for the small- and medium-size data-entry operation.

In addition to hand-print numbers, the 3886 can recognize letters printed in OCR-A or the OCR-B font.

IBM's reader also can read gothic numerals – normally used for ID or serial numbers on preprinted forms.

Processing speeds vary with the size and format of documents, which can range from 3 in. by 3 in. to 9 in. by 12 in.

Documents 3 in. by 3 in. with only eight characters of data are read into a computer at about 5,800/hr or onto magnetic tape at about 5,200/hr.

Standard typewritten pages of 8-1/2 in. by 11 in. are entered into a computer or onto magnetic tape at approximate rates of 330 and 300 page/hr, respectively.

The unit has an internal data storage device and processor so users can process customized documents of varying sizes on the same run.

The unit can also be equipped to number each document in sequence and to mark lines where errors occur. These marks can be referenced to correct and reprocess documents.

The 3886 will operate under IBM's new virtual storage programming, Disk Operating System/Virtual Storage (DOS/VS) and, in early 1974, Operating System/Virtual Storage 1, according to a company spokesman.

Designed for the first time user, the 3886 optical character reader will enable many users to read data from source documents right into their computer or onto magnetic tape without the interim step of re-keying data to another machine readable form, such as punched cards, according to IBM.

"Banks, insurance companies, and utilities, for example, can use the new character reader to enter preprinted, typed or hand-numbered data, updating customer records and providing up-to-the-minute information for financial and management reports.

The low price and performance capability of the 3886 appear to provide a good entry-level machine for thousands of low-volume data processing installations which could not previously justify OCR, and, at the same time should be a major factor in the increasing understanding and utilization of OCR, according to the President of another OCR manufacturer.

Model 3886 reads printed or typed alphanumeric data.

Under IBM's extended-term plan – which provides for a 24-mo contract – rental begins at $1,970/mo. Short-term leases are available from $2,315/mo. Purchase prices start at $91,000.

First customer shipments are scheduled to begin in the third quarter of 1973.

DP Managers 'Not Active Enough'

By Michael Weinstein
of the CW Staff

BOSTON – Senior DP managers are guilty of too much "renaissance thinking" and not enough active personnel management, according to a recent study by Arthur D. Little Inc.

If managers would treat their computer operations as a "factory floor" which produces "the EDP product," data processing productivity could improve by as much as 30%, the study claimed.

The study suggested that managers view the computer operation as containing six "line" functions – data preparation; data control; scheduling and staging; computer and hardware operations; control of output; and delivery of finished work.

By breaking the operation into components, the manager can isolate problem areas that affect the entire operation.

The report suggested three initial steps for managers to identify and correct weaknesses.

First, review personnel procedures to ensure incentives and recognition programs exist for operating employees. This does not mean salary incentives and escalation alone; "almost never, in our experience, have salaries been the only cause of general complaint."

Second, take a walking tour through the operations area. Are conversations loud? Is there a great deal of motion? Are personnel constantly on the telephone? These are tell-tale signs of poor machine-room layout. It is said that kitchens have been studied more than computer rooms for improved efficiency. A walk through most installations would confirm this fact, the study continued.

Third, personally review internal paperwork. Do not do this with the idea of verifying all paperwork – job control reports, performance measuring charts, etc. give an indication of the efficiency and thought behind producing the "EDP product."

In assessing the level of efficiency, ADL suggested managers should measure their center against 10 common indicators of poor operation:

- Regular delays in routine production work.
- High level of job reruns.
- Regular need to schedule extra machine time because of unplanned job overflows.
- Lack of orderly appearance of physical plant.
- High rate of operations staff turnover.
- Lack of a clear development program for operations personnel.
- High level of data-entry errors.
- High level of keypunch or data-entry errors.
- Limited number of internal department measurement procedures.
- Consistent requests for more hardware, or complaints of hardware inadequacy.

These symptoms of operational disorder are likely to appear in every organization, the report counselled managers, but the degree and intensity can indicate whether problems are present.

For example, a high level of reruns is almost certainly due to carelessness in operations personnel.

If overflow problems – often represented by a backlog of jobs demanding machine rescheduling – occur frequently, this suggest operations department difficulties. All too often these problems are documented as user difficulties.

"An old myth in the EDP business is that personnel should move along a career path from operators to programming and then to systems design. In the process, many fine operations personnel have been converted to marginal programmers," the study noted.

As computer installations become more complex, according to ADL, efforts must be taken to train and keep staff to run equipment in a multiprogramming environment and to deal with matters such as core fragmentation, priority scheduling, telecommunications, multiperipheral devices and exception conditions.

Incentives and personal concern for the well being of operations personnel are the foundation upon which good operations are built, not with salary alone. The study states "almost never, in our experience, have salaries been the only cause of general complaint."

If a manager will spend more time improving his personnel's operation, he will see a marked improvement in the system's operation, the study concluded.

Printer Has 70 Char/Sec Rate

WOBURN, Mass. – The Model PT-100A printer offers users an upper- and lower-case printing capability at relatively high speeds and at a cost comparable to I/O typewriters and related output terminals, according to the developer, Printer Technology Inc.

Key features of the new machine are a 96-character font, 70 char./sec print rate – equivalent to 26 line/min at 132 col/line, ability to print 6-part forms on standard paper, disposable ink roller instead of conventional ribbon, inclusion of a 2-channel Vertical Format Unit (VFU) and 8-bit Usascii interface – all within the $2,600 base price.

The unit's 70 char./sec print rate is five times faster than an IBM Selectric's 15 char./sec rate, even though both machines are comparably priced.

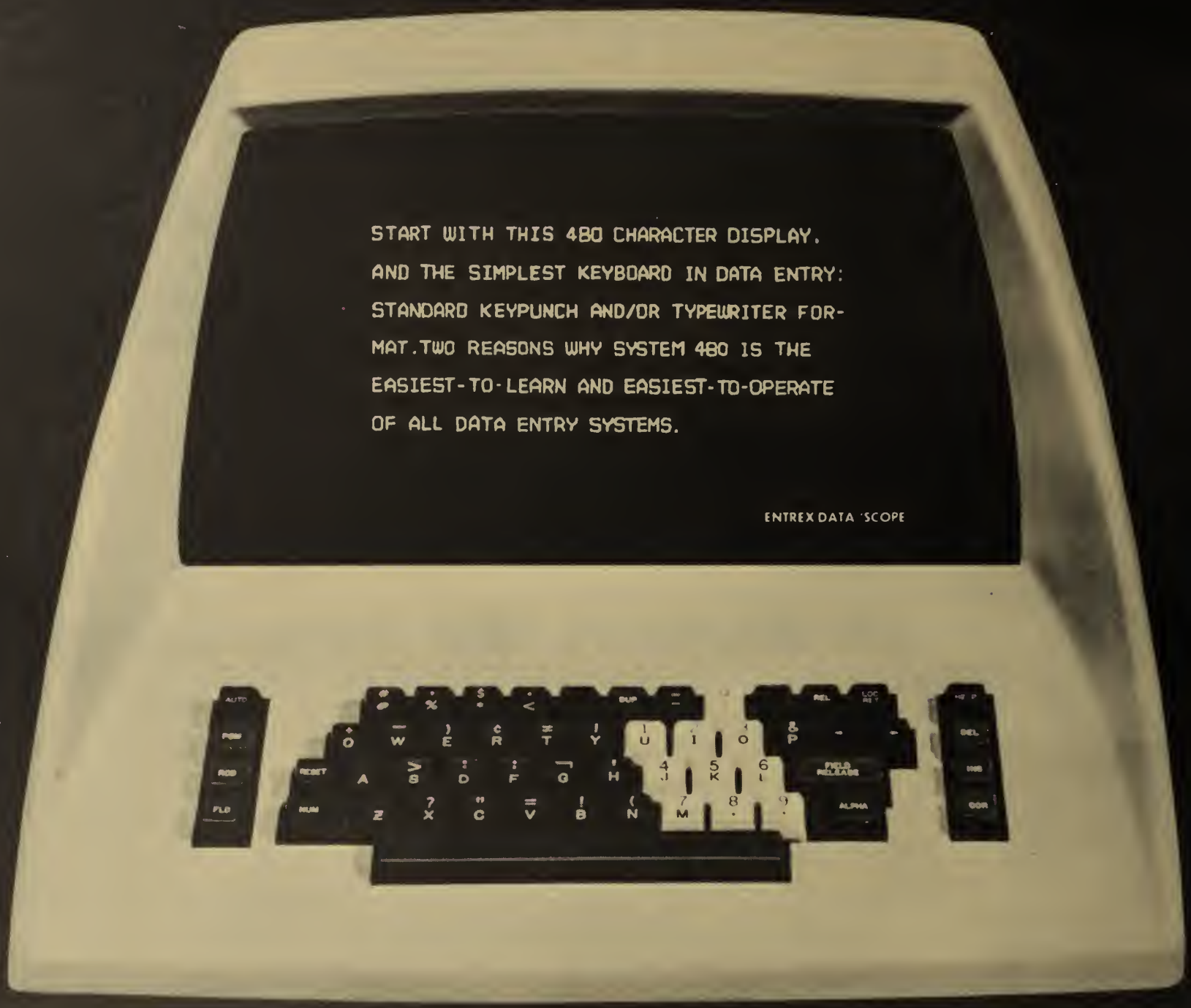
The PT-100A uses electrically timed hammers to drive the paper against selected characters on a print wheel. Using separate sets of hammers for each character set enables the printer to print several times faster than conventional impact machines – which use only one hammer and one character set, according to the firm.

Applications for the new machine include communications, word processing, text management, key-to-storage systems and preparation of CRT hard copy. Its ability to print both upper-and lower-case symbols provides a low-cost editorial and typesetting capability.

The PT-100A can provide galley-proofs for manuals, reports, etc., giving the machine a role as a satellite to complex phototype equipment.

Optional extras include buffers, modems, different type fonts, 8-channel VFU, plus a range of interfaces from Woburn Industrial Park, 01801.

see for yourself *



Entrex System 480 key-to-disk is the best product in data entry

Here's why...

That's only the beginning. System 480 is also the most powerful key-to-disk system on the market. The most flexible. The leader in *cost-performance*. With up to 32 DATA/SCOPE keystations. A 65K processor. Up to 10,000,000 bytes of intermediate disk storage. A variety of tape drives for final output. A printer. Communications capability. And the most comprehensive software in key-to-disk.

Most powerful software:

System 480 packs in more software features and capabilities than any other product in data entry. All aimed at the non-technical user who wants simple, quick training and implementation. *Immediate, tangible savings.* Application flexibility. Even decentralized data input.

Take input, for example. System 480 handles unlimited input record formats. Unlimited record sizes. Operators have ten program levels to work with. Changing input formats is simple.

All data is edited and checked with the source document in hand. System 480 performs every kind of edit check as data is keyed —and not at the end of a batch. Like range checking and table lookup. Multiple check digit validation. Mandatory entry and field boundary checks. Crossfooting. And more. Errors are caught when they should be caught —without the loss of a keystroke. Verification is often unnecessary.

In fact, System 480 has the *simplest error correction procedures* in the industry. Features like error flag insertion, searching, character strike-over capability and character or record insert/delete are all standard. Data commonly duplicated is corrected only once —since it is recorded only once.

Output is just as flexible. *Output record formatting and reformatting is unlimited.* You can explode and implode records. Emit repetitive data. Produce multi-file output from single source recording—with complete independence of format between tape and printed output.

System 480 has the software features and capabilities your business needs. More than enough to guarantee more throughput and lower costs—no matter what your present method of data entry.

Easier training and operation:

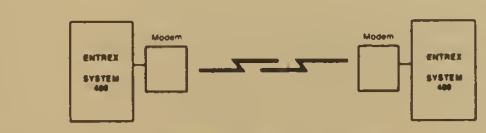
With System 480, training and operation couldn't be simpler. The keyboard is standard keypunch and/or typewriter format. Keystroking is a breeze. Data is entered just as it's read —line-by-line from top to bottom. Operators learn the system in a few hours—and are productive their first day. Using our exclusive cassette training program, new operators can be trained without disturbing others in the area.

The 480 character visual display is designed for constant interaction. Operators get discrete error messages, fill-in-the-blanks instructions and a range of labels and tags to work with. And you don't have to be a programmer to use the software. Supervisors are capable of developing their own formats (programs). Any keystation can be used as a supervisory station with password protection.

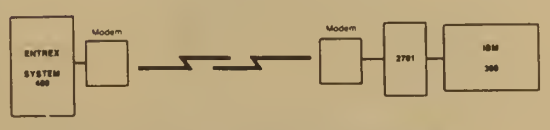
Our *exclusive HELP! button* and tutorial displays make it even easier. HELP! guides the operator through all normal functions and displays alternatives for any situation she's unsure of. Another reason why System 480 is easy-to-learn and easy-to-operate. And the best in the business.

System-to-system communication:

System 480 can now communicate with another System 480 or with IBM System/360/370 and many other business computers. You can organize your data entry the way your business is organized. Validate data as it is entered—and transmit accurate data ready for processing to another location.



480-480 Communications



System 480 to IBM 360 Communications

Transmission is via leased lines or the switched telephone network. Data can be transmitted from a System 480 tape drive or disk. Records can be any desired length and blocked as needed. Data entry and verification continue without interruption during transmission. Once prepared for transmission, the remote System 480 can be left unattended.

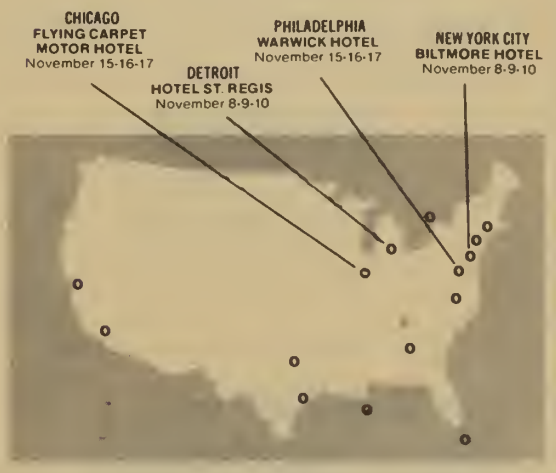
Remote keystation communications:

Now you can decentralize System 480 data entry—using remote DATA/SCOPE keystations. All the editing and processing you can perform at your central system you can perform at any distance. Remote keystations connect to any System 480 over 2-wire leased telephone lines, using a modem supplied by Entrex. Remote keystations give you all the performance and time-saving advantages of onsite data entry—from any number of remote locations.

*see for yourself:

Don't take our word for it. Or even that of our 100 plus users. See for yourself what makes System 480 the best product in data entry. Catch one of our demos this month. Check this schedule and send in the coupon for more details. Or see System 480 at any one of our sales offices.

Demo schedule



o Branch Sales Offices:

Baltimore	**Los Angeles**	**Atlanta**
Boston	**New York**	**Dallas**
Chicago	**Philadelphia**	**Houston**
Detroit	**San Francisco**	**Miami**
Hartford	**Toronto**	**New Orleans**

New Offices in 1972:

Entrex, Inc.
168 Middlesex Turnpike
Burlington, Mass. 01803

☐ Please count on me for your demo
in _____ on _____

☐ Please send information on System 480.

Name .....

Company ..... **Tel** .....

Address .....

City ..... **State** ..... **Zip** .....

ENTREX

ENTREX, INC.
168 Middlesex Turnpike
Burlington, Mass. 01803
617-273-0480

New! 1401 SIMULATOR
"SIM14" TM
NOW AVAILABLE FOR 360-50-65 USERS

- EXECUTES UNDER BOTH DOS & OS
- SUPPORTS 1401 UNIT RECORD, TAPE AND DISC DEVICES
- JCL AND FILE COMPATIBLE WITH CS30-40
- SELF RELOCATING FOR MULTIPLE PARTITION EXECUTION
- THRUPUT SPEEDS EQUAL TO CS40
- PROVEN PRODUCT BY CUSTOMER USE
- TAKE ADVANTAGE OF 360-50-65 LEASE PRICES WITHOUT HAVING TO REPROGRAM ANY 1401 PROGRAMS

Call or Write
DEARBORN COMPUTER LEASING CORPORATION
Subsidiary of Dearborn-Storm Corporation
4849 No. SCOTT, SCHILLER PARK, ILLINOIS 60176 312 671-4410

THE RCA AUTOMATED PURCHASING SYSTEM.

Basic Features:
Flexible and adaptable
Automatic Purchase Order Generation
Price History and Order Status availability
Automatic Receiving System
Automated Inbound Shipping Information
Broad Reporting and Analysis Capability
Management Control of the complete Purchasing Activity Available for Univac Series 70 and IBM 360/370 with a minimum 128K memory
Interfaces readily with a variety of other systems

The System has been running in multiple RCA locations for two years.
For further information contact:

RCA
R. B. Green, 24th Floor
1133 Avenue of the Americas
New York, N.Y. 10036
(212) 586-3000, Ext. 8657

The Novar 5-01 Auxiliary Tape Unit can be added to the 5-50 and 5-60 terminals at any time, converting them to 5-51 and 5-61 systems. Over and above the capabilities of the systems themselves, the 5-01 has edit capability as a standard feature, and can be equipped to automatically search recorded tapes at high speed, locating information by either Stop Codes, or by Records.

GTE INFORMATION SYSTEMS INCORPORATED
2370 Charleston Road
Mountain View, California 94040
(415) 966-2272

Bits & Pieces

System Stores Text For Letters on Disk

SPRINGFIELD, Mass. – A computerized text preparation and mass mailing system is available from LCS Corp.

The Compu-Text system prestores paragraphs of text used in identical or similar form letters or documents on random-access high-speed disk. This allows all text to remain on-line and eliminates the need to store, file and change cards or tapes, according to the firm.

Full editing capabilities allow documents to be stored for editing or revision prior to output of final copy.

The Compu-Text system is configured around a PDP8/E with I/O terminals including IBM Selectric typewriters, display units and a line printer which can output text at 200 line/min., upper and lower case.

Initial cost for the system is $50,000 or $1,200/mo for a five-year lease from 31 Elm St., 01103.

Printer/Plotter Interfaces Most Minicomputers

MELVILLE, N.Y. – The Alphagraphic Printer/Plotter Model 1100 from the Datalog Division of Litton Industries functions as a line printer – 180 line/min on a 128-column line – and as a digital plotter – 168 resolution elements at a rate of 75/in.

The Alphagraphic can be interfaced to most minicomputers and is expected to be most useful to scientists in the preparation of combined listings and graphs, according to the firm.

Unit prices for the Alphagraphic 1100 range from about $3,900 to about $7,100 depending on the facilities included. Delivery is 30 days from 1770 Walt Whitman Road, 11746.

EPI Expands Mini Line

ENGLEWOOD, Colo. – Electronic Processors Inc. has expanded its minicomputer line with the EPI-218 which features 18-bit word length and 92 hardwired instructions.

The mainframe can be equipped with from 4K to 24K of memory – up to 32K on an expansion chassis – three to 23 I/O device interfaces, hardware multiply/divide, hardware interrupts and/or a DMA channel.

Basic price for the EPI central processor with 4K memory, 960 nsec cycle time, I/O system, eight registers, arithmetic/logical unit and power fail protect with auto restart, plus I/O, CPU, and memory mother boards starts at $3,490 from 5050 S. Federal Blvd., 80110.

Sierra Adds Disk Subsystem

BURLINGTON, Mass. – Sierra Data Systems has added a disk-file unit to subsystems available on its SDA-770 data collection and monitoring system.

The unit provides up to 24M, 8-bit character memory with an average access time of 60 msec. Transfer rate is 97,000 word/sec.

Basic price for the SDA-742 Disk File with controller and 12M char. memory capacity is $34,000 from 217 Middlesex Tpk., 01803.

Programmable Calculator Uses Basic, Costs $6,700

TEWKSBURY, Mass. – Users can get a complete Basic language computer system with the Wang 2200 Advanced Programmable Calculator for $6,700 from Wang Laboratories Inc.

Elements of the 2200 system include a hardwired compiler, 4K initial memory, display unit and keyboard.

As an option, the user can incorporate a cassette tape unit to retrieve programs or data. The display unit is available with both the CRT and cassette subsystem, or with the CRT alone, the firm said.

The display screen presents 16 lines of 64 characters, enabling the user to view data input, program steps and resultant calculations. In addition, when "end program" is keyed, the display screen indicates the amount of unused memory still available.

By hardwiring the Basic compiler into the 2200 – using microcoding – the user can have all of memory as work area, the firm stated.

The initial 4K-step memory can be expanded in increments of 4K to a maximum of 32K within the interior space of the original calculator unit.

Customized Keyboard

The keyboard provides individual keys for letters and special function keys which can be customized by the user for any application function. Numeric, trigonometric, exponential and mathematical function keys are standard.

Correction and editing capabilities such as backspace line correction, program or segment renumbering by block insertion, single line deletion and/or replacement are included.

The system provides capability for alphanumeric processing of data files, variable-length string variables and string arrays. Program chaining and overlays are accomplished automatically with load and overlay statements so cassette tapes and a common data statement can be used to pass variables to subsequent programs.

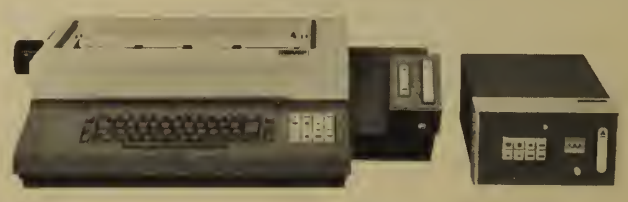
Wang 2200 offers Basic language programming

Error diagnostics and debugging features include pointer which shows the user where in a line an error has occurred while the error code is displayed on the CRT.

The halt/stop key allows the user to single-step a program to facilitate analysis.

Also available is the 2201 Output Writer – a modified Selectric typewriter – which functions as an alphanumeric printout unit actuated and controlled from the 2200's keyboard.

The firm is at 836 North St., 01876.



Novar 5-51 and 5-61 Systems, with multiple tape units, perform the functions of telecommunications, teleprocessing, error-free power typing, automatic typing, and can be used for high speed interoffice terminal-to-terminal communications. When used with ATS, these systems provide for editing, insertions, corrections and re-ordering of data. A lot of capability in a desk-top unit!

GTE INFORMATION SYSTEMS INCORPORATED
2370 Charleston Road
Mountain View, California 94040
(415) 966-2272

Non-Afips Groups Set Program

FJCC Seminar Looks at DP in Medicine

By a CW Staff Writer

MONTVALE, N.J. – Computer uses in the medical community will be one topic of discussion during a full-day seminar to be held in conjunction with the Fall Joint Computer Conference next month.

The medical adjunct program is one of four applications seminars scheduled during the meeting, Dec. 5 - 7.

The program, officially called Computers in Medicine and Health Care, is being planned by Kenneth Pierce, vice-president of Health Datanet, a not-for-profit corporation developing and implementing shared hospital information systems.

Pierce is planning the program under the sponsorship of the Society for Computer Medicine and the Southern California chapter of the Hospital Management Systems Society, a branch of the American Hospital Association.

This sponsorship by an "outside" society drew criticism last summer from within the American Federation of Information Processing Societies (Afips), the group which sponsors the entire joint conference.

Anthony Ralston, president of the Association for Computing Machinery, the largest of the Afips societies, said there was sufficient expertise within Afips' groups to plan such a seminar, but his objections were overruled by the planning committee.

One apparent goal of this approach, Afips has indicated, is the broadening of the attendance base to include DP people who normally might not attend a joint conference.

Pierce said the program is being designed to appeal to hospital administrators, planners, physicians, data processors and "other related professionals."

It will be divided into four sessions, Pierce added, to cover business computing, medical computing, hardware considerations and a case study of an "existing facility that is in the planning stage for the future."

While the site was not identified in early publicity, Afips said several ongoing problems will be discussed in the hopes that the audience might offer, as well as ask about solutions.

Societies / User Groups

A user panel in the seminar will take the theme of "the DP man looks at medical computing," Pierce related, and a physicians' panel will discuss "the status of medical computing."

The medical seminar will take place Tuesday, Dec. 5, opening day of the three-day conference in Anaheim, Calif. Information is available from Afips headquarters here, 210 Summit Ave., 07645.

Ifip Group Planning Mock Trial to Study Legal Issues in DP

COPENHAGEN, Denmark – A mock trial to study the "exploitation of data bases" is being prepared by a Danish law professor as part of an upcoming conference Nov. 15-17.

Mogens Koktvedgaard, a specialist on legal problems in EDP, will illustrate problems likely to occur in a case in which one data center sues another which has lured away and employed personnel with "specific know-how."

Part of Data Centre '72, the trial will be heard by an international tribunal of law professors, but attendees will also be able to use time-sharing terminals to indicate their opinions.

The audience-opinion system is known as the Conference Opinion Polling System (Cops), and was developed by an international DP association known as IAG; the association will sponsor the conference at the Sheraton-Copenhagen Hotel.

IAG is the administrative data processing group of the International Federation for Information Processing (Ifip).

The trial is meant to point up the various aspects of possible new laws governing computer usage, particularly around "exploitation of data bases," conference officials noted.

The Cops system will be used to poll audience opinion on other items besides the mock trial, officials noted. The terminals in the conference area of the hotel will transmit and receive data on audience ideas immediately after formulated questions of a yes/no nature are posed.

The chief topics for discussion include users and suppliers of data services, as well as social impact and the effects of data centers on each other.

Danish IAG, the branch of Ifip with planning responsibility, has additional information, at 58 Bredgade, DK 1260, Copenhagen K., Denmark.

The Computer Caravan welcomes

ENTREX INC.

As an exhibitor in the 1973 Spring Caravan

Entrex will exhibit System 480 Key to Disk, the most sophisticated product in data entry. The System 480 features a 480 character CRT, Standard keypunch or type writer keyboard, remote keystations, system to system communications, printers and powerful software capabilities. Entrex new Remote Intelligent Data System will also be demonstrated.

What may we say about your company?

Call us: (617) 332-5606

The Computer Caravan/73

sponsored by

COMPUTERWORLD

Boston • Washington • New York • Atlanta • Houston • Anaheim • San Francisco • Kansas City • Chicago • Cleveland

TRYING TO REACH THE EDP MARKET?????

Selling computers? **Selling Supplies?**

Marketing software packages? **Selling terminals?**

COMPUTER '72 will provide you with leads . . . . . accurate leads to where the computers are.

COMPUTERS '72 will tell you who has purchased fourth generation equipment; where Systems 3 installations have been made and what companies have installed scanners, digital display, key/tape, key disk and more.

COMPUTERS '72 is a series of seven separate directories covering the following geographic areas:

Northern California
Southern California
Pacific Northwest (Wash., Oregon, Idaho, Utah, Nevada and Arizona)
New York City
New England
New Jersey and Long Island
Connecticut and Southern New York (not including NYC)

COMPUTERS '72 provides the name and address of the site, the person who buys, a site description and a telephone number, all in convenient paperback format.

I have included my check ☐
Or purchase order ☐
For COMPUTERS '72 of
Northern California ☐
Southern California ☐
Pacific Northwest ☐
New York City ☐
New England ☐
New Jersey and Long Island ☐
Connecticut and Southern New York ☐

1 or 2 copies	$30/book
3,4,5 copies	$25/book
6 or more	$20/book
2 of same book	$25 each
3 or 4 of same book	$20 each
5 or more of same book	$17.50 each

(No directories mailed without check or purchase order)

Name_____

Company _____

Address _____

City_____ State_____ Zip_____

Telephone No._____

CW Associates
P.O. Box 144
Babson Park, Mass. 02157
Tel. (617) 969-4640

Limited Copies Remaining – Order Now!!

Four Patterns Followed

DP Curricula Theory Strengthened by Outside Work

Not long ago students who wanted to augment academic work with practical experience had to do it entirely on their own – during summers or by part-time work during the academic year.

Schools which included actual experience in their programs were considered by the "better" schools as "too vocationally-oriented."

J. Daniel Couger On Education

This situation is rapidly changing. A growing number of instructors of the data processing curriculum are reinforcing the theory with practical application.

Four principal approaches are utilized:

- Students alternate between full-time employment and academia – with no formal academic credit for the work but compensation at the same rate of pay of any other employee of comparable experience
- The student receives nominal financial compensation but is granted 10 to 15 semester hours credit during the term of employment
- A full-time student is assigned a work project for which he receives 3 to 6 hours credit
- A full-time student completes a project and receives credit as a portion of one of the required courses in the curriculum.

Cooperative Program

Northeastern University (Boston) has formal relationships with organizations throughout New England, and students work full-time every other quarter beginning in the sophomore year. Instead of alternating quarters, MBA candidates are assigned two work sessions: a 13-week experience and a 26-week experience.

Dr. Warren Briggs, one of the six faculty members teaching courses specifically related to the information systems elective, reports that students typically are assigned good jobs at "the going rate of pay."

Some 8 to 10 Co-op Coordinators work full-time on maintaining the co-op program for the School of Business, which has approximately 3,500 students. These persons hold academic rank and are a regular part of the faculty.

While a student might start work in data control or computer operations, he usually is working as a programmer or junior analyst by graduation. The work experience is required and a formal report is prepared by students at the end of each session. However, no formal credit is given.

Work/Study Program

Ferris State College (Big Rapids, Mich.) grants students 12 hours credit for employment in programming or system analyst jobs.

Two hundred and eighty students are enrolled in the undergraduate program and complete a 3-credit hour systems project before they begin the work/study program. However, the normal 120-credit hour degree requirement is increased to 135 hours for these students.

Dr. Walter Corvine, department chairman, says the additional hours are required for accreditation; however, he feels the accrediting association will soon allow credit for work experience. Students prepare formal reports on their work experience.

Students are paid at the trainee level and typically are employed for the summer term. "Some 95% of the students end up working for the firm that employed them during their work/study program," Dr. Corvine said.

California State Polytechnic College has a similar program.

Students work part-time for one or two quarters, usually as beginning programmers, and receive up to three credits for this work, according to Professor Ron Eaves, assistant director of the Data Processing department.

Independent Credit Projects

Students in the University of Minnesota MBA program receive five quarter hours credit for projects undertaken in the last three months of their program. They are typically team projects with 4-5 members.

One team developed a case simulation of a teleprocessing application for Northwest Computer Services. Another team conducted a cost analysis of the computer center for the 3M Company.

A billing estimating model was developed for the local gas and electric utility by a third team.

A fourth team designed a timesharing application on security analysis for the Investors' Diversied Company.

The school also has a summer work/study program where the student earns four quarter hours credit for work as a programmer or system analyst. The typical student receives about $600 per month.

Course Projects

Graduate students in Dr. Jim Emery's course (University of Pennsylvania) last semester were assigned to one of two teams designing a billing system for the faculty club or a cash flow analysis system for the University.

Dr. Bob Hagin's students designed an inventory system for a supermarket. Their report included the design of modules for programming. This fall Dr. Emery's classes are developing a faculty data base for the University planning system or a course evaluation system for the University.

Couger is Professor of Computer and Management Science at the University of Colorado.

NSF Funding Network Seminars

PRINCETON, N.J. – The National Science Foundation has awarded the Interuniversity Communications Council (Educon) $113,600 to run three two-day seminars related to a national science computer network, first proposed by NSF at an Educom meeting last spring [CW, May 3].

The seminars will be held in Warrenton, Va. The first, on Nov. 19-21, will emphasize user characteristics and needs. The second, on Dec. 10-12, will study organizational matters. And the third, on Jan. 7-9, will consider operations and funding of the proposed network.

The sessions will be led by Martin Greenberger of Johns Hopkins. The NSF grant includes funds to cover travel and living expenses of participants. Applications for the third seminar are still available from Educom, P.O. Box 364, Rosedale Road, 08540.

Next May, we're opening the world's second largest computer market.

Our new European Computer Caravans will bring your products or services within a hundred miles of 85% of European Computer users.

The U.S. Computer Caravan is a proven success. And now we're taking the concept to Europe – with three European Computer Caravans. If you now market in Europe, you'll find your present and future customers attending the Caravan. And you'll be able to deal with them in an effective selling atmosphere.

If you aren't currently marketing in Europe, you're missing a $4 Billion market. And we can help you break into it. With our new Computer Caravans – and with a variety of optional services, including:

- overall market data
- customized marketing research through IDC, the world's largest EDP research organization
- advice on how to get government help
- expert booth staffing to identify prospects and screen potential representatives

That's just the overview. Why don't you get the whole story by writing or calling Neal Wilder or Dottie Travis (617) 332-5606. They'll be glad to send you a copy of our free brochure.

French Market Caravan
May 1 – June 7, 1973
Paris
Bordeaux
Marseilles
Lyon
Strasbourg
Brussels

English Market Caravan
Sept. 4 – Oct. 18, 1973
Stockholm
Oslo
Copenhagen
Amsterdam
Glasgow
Manchester
London

German Market Caravan
Oct. 23 – Dec. 6, 1973
Hamburg
Dusseldorf
Frankfurt
Stuttgart
Munich
Berlin

The European Computer Caravans
sponsored by

COMPUTERWORLD
797 Washington St., Newton, Mass. 02160

COMPUTER INDUSTRY

CI Notes

Univac Set to Acquire EMR

NEW YORK – Univac has agreed in principle to acquire EMR-Computer of Minneapolis, Minn. The final agreement will insure EMR customers of continuity of service, maintenance and software support, according to the companies.

EMR-Computer, a division of Weston Instruments, Inc., produces medium to large-scale scientific computers for specialized systems applications.

Honeywell, Siemens Ink Traffic Pact

Honeywell Inc. and Siemens AG have agreed to develop and sell advanced computerized traffic-control systems in the U.S. and Canada.

Current annual U.S. and Canadian industry sales of an estimated $60 million in traffic-control equipment are expected to double in five years, with most of the growth coming in advanced computerized systems, according to Clyde A. Parton of Honeywell.

IDC Obtains Permanent Injunction

NEWTONVILLE, Mass. – International Data Corp. has obtained a permanent injunction against KLH Associates, San Francisco, prohibiting KLH Associates from utilizing, or distributing or marketing in any form proprietary information taken from the IDC data file of computer installations in the U.S.

All other issues in the case have been resolved, J. Thomas Franklin, IDC general counsel, stated, and all the assets and good will of KLH have been transferred to CW Associates, P.O. Box 144, Babson Park, Mass., which will undertake the liquidation of such assets for the benefit of IDC.

Supershorts

Four-Phase Systems, Inc. has signed an agreement with Telco Leasing, Inc. for a national lease program for up to $4 million of intelligent terminal systems.

– – –

Q1 Corp. has appointed Auditec, Inc. as its first marketing dealer representative for Q1 Office Computer systems in the U.S.

– – –

The General Electric Co.'s support of the development of the educational time-sharing system at Dartmouth College was recognized in a special ceremony at which college officials unveiled a plaque commemorating GE's gifts of computer equipment to the college.

– – –

That marketing agreement between Boothe Computer Corp. and Genesis One Computer Corp. [CW, Oct. 18] doesn't mean that Boothe is closing down its own offices. Boothe estimates its own offices in major metropolitan areas will account for 80% of sales, with Genesis One offices in other areas providing 20%.

How to Stop Monopoly?

Different Views Greet Justice Plan

By E. Drake Lundell Jr.
Of the CW Staff

The computer industry was split down the middle last week over the Justice Department proposal to break up the industry giant, IBM, into an unspecified number of "discrete" parts.

One side believes the breakup would foster competition, and therefore would be good for the industry, but the other side indicated that dealing with more than one IBM might be harder than dealing with the present organization.

Both sides, however, expected to see little if any concrete action on the government's proposals within the near future.

Several sources indicated that IBM may be able to put off the entire issue if it can get a separate trial on just the market definition issues in the case.

"We have stressed the need for meaningful structural relief to restore competition to this vital industry," William C. Norris, president and chairman at Control Data Corp. said.

Noting that CDC was also suing for the breakup of IBM, he added, "It is heartening to note that the government recognizes that need, and is now moving vigorously toward such relief.

"However," Norris stated, "industry has been changing and we must insure that any relief obtained will be sufficient to prevent IBM's dominance of the growing complementary markets such as the semiconductor business, time-sharing and data services, programming, terminals and communications equipment.

"We fear that the divestiture alone might not be sufficient, but we recognize that all of the details of the government's proposals have not been stated and that restrictions on IBM's extension of its dominance into these related markets may be provided for."

Another source in the industry agreed that the breakup would be good. "I would rather compete with five or six small IBMs than with one that dominated the industry with 70% of the shipments," he said.

"The smaller companies might even be able to get together on industry wide standards, and not just have to accept standards made by one giant company," he said.

Another disagreed, however. "Even if IBM is broken up into five or six parts," he said, "each part would be a dominant influence in the industry and would have a larger market share than the other mainframe makers. Who could stop them from getting together surreptitiously and controlling the market?"

One peripheral maker saw the planned breakup in an ambivalent manner.

See Related Story on Page 25

"I'm glad they have taken the approach of dividing IBM into a lot of small companies capable of offering a complete line," he said, "because if they broke it up into a mainframe company, a peripherals firm, a software house and so forth, each of the pieces would control that industry segment.

"But at the same time, if there are no good industry standards developed, it will be hard to make plug-to-plug compatible equipment if each of the smaller companies sets its own interface standards.

"It could be a real disaster if the government let that happen in the future. The cure would definitely be worse than the disease," he added.

Univac Posts Record Earnings, NCR Manages Nine Month Profit

Two more mainframe makers have posted good financial results, with both Sperry Rand and NCR noting improved order rates in the first nine months of the year.

Sperry Rand Corp. revealed record second quarter earnings as well as six month earnings and revenues, noting a 30% rise in DP orders for its Univac Division since January.

NCR managed earnings of $4.4 million in its third quarter, down slightly from the same period last year, but enough to combine with $2.8 million second quarter earnings to bring the firm into the black for the nine months, thus overcoming the $6.8 million loss in the first quarter.

Orders for the year to date are up 9% over last year, with the greatest increases in DP equipment and accounting machines, the firm said.

At Sperry Rand, second quarter earnings rose a whopping 75% over those of the comparable year-ago period, with earnings totaling $19.5 million or 57 cents a share compared with a restated $11.2 million or 33 cents a share.

Revenues reached $529.2 million from $406 million in the period last year.

In the six months, earnings rose 54% to $37.4 million or $1.09 a share compared with $24.4 million or 71 cents a share in the same 1971 period.

Revenues topped the billion mark, up from $820 million last year.

Third Quarter Report

NCR's third quarter report showed earnings of $4.4 million or 19 cents a share on revenues of $389.7 million, compared with the same year-ago period, when earnings were $4.4 million or 20 cents a share on revenues of $354.1 million.

Added to the second quarter earnings of $2.8 million, the third quarter results were enough to overcome the deficit, allowing NCR to post nine month earnings of $396,000 on revenues of $1.1 billion. In the same 1971 period, NCR's earnings reached almost $17 million on essentially the same revenues.

"The costs of phasing out older products and starting up production of new products, plus the realignment of several major manufacturing operations, continue to affect profits adversely," an NCR spokesman said.

"These higher than normal costs are expected to continue during the remainder of 1972 and the early part of next year, but should result in important long-term benefits," he continued.

Growing Market Seen

Europe Contains 27% of DP Base

BOSTON – Almost 27% of the total computer equipment market lies in Europe, Patrick J. McGovern, president of International Data Corp., said last week during a traveling seminar on European marketing opportunities sponsored by the computer industry research firm.

At the end of 1971, there were just over 32,000 CPUs installed in Western Europe or about 22.4% of the world wide installation total, and another 6,665 machines installed in Eastern Europe.

Germany was the best market for computer equipment in Europe, he indicated, with installed equipment valued at around $2.9 billion, followed by the UK with $2.5 billion, France with $2.3 billion, the USSR with $1.5 billion, and Italy with just over $1 billion.

At the same time, he indicated that European countries had not achieved the computer penetration as measured as a percent of the gross national product as found in the U.S.

Considering the ratio of computer installation value to GNP with the U.S. at 100, Germany has a ratio of 52, the UK a ratio of 70, France a ratio of 48, Italy a ratio of 38 and the USSR with a ratio of 10.

This means that out of the total European market the USSR needs $13 billion more CPU investment to reach the U.S. level, he said.

Germany needs a $2.7 billion increase, France needs a $2.3 billion increase and Italy needs a $1.7 billion increase from the present installation level.

We show a history of making the printers that make money for EDP centers through off-line printing. You should see our System/4000 Satellite Printer do it. It interprets mainframe print format instructions, and processes 7- and 9-track tapes of from 200 to 1600 bpi densities at up to 1340 lpm. Get the System/4000 with a FACT controller to handle multiple-format programs and data tables. Get it with an ACT controller to translate vertical-format and data-character sets from magnetic tape codes to printer action codes. Getting the just-right Satellite can be a profitable experience. Especially since we can beat *any* competitor's price. So get in touch.

Our off-line printers: you can profit from our experience.

DATA PRODUCTS

Systems Marketing Offices: Boston 617/237-1950; Chicago 312/325-6630; Cleveland 216/464-2151, Dallas 214/231-8265, Detroit 313/354-5880; Los Angeles 213/475-0681, New York 212/532-9504; Philadelphia 609/667-2000; San Francisco 415/421-9375; Washington, D.C. 301/652-8120. **Home Office:** Data Products Corporation, 6219 Da Soto Avenue, Woodland Hills, California 91364. 213/887-8000, TELEX 65-1347.

Australian DP Growth Slows

Special to Computerworld

SYDNEY, Australia – The growth rate of the Australian computer industry in terms of the total number of machines installed was slowed substantially in the year ended April 1972.

Figures show an overall increase of 9.1% in the period, in sharp contrast to an increase of 26.5% the previous year.

In terms of actual machines installed, the total population was 1,120 at the end of the most recent period, an increase of 94 in the 12-month period.

Only one mainframe manufacturer, Burroughs, improved its growth rate in the latest period compared to the year ended April 1971. Burroughs' rate was 25% in 1971-72 compared with 12% in the 1970-71 period.

Every other manufacturer saw its growth rate fall, although several of these tended to return to a more normal rate after very sharp jumps in the 1970-71 year. Honeywell, NCR and Univac were such companies.

One significant feature was the net loss in installed machines attributed to both ICL and IBM. The latter, with 289 machines installed at the end of the latest period, is still the leader, but its total the year before had been 309. ICL, with 151 units installed, is back to its 1969-70 figure after a total of 162 in 1970-71.

The mainframe manufacturers shape up as follows: IBM (289), Honeywell (186), ICL (151), NCR (124), CDC (51), Univac (43) and Burroughs (35).

Among the minicomputer companies, Digital Equipment still has the most installed machines but is losing some of its lead.

The growth of Hewlett-Packard has been particularly noticeable. Nevertheless DEC's total installations still exceed the combined total of HP, Fairchild and the survey's miscellaneous group of smaller suppliers. Of this latter group, Interdata's total of 11 machines installed in just one year's marketing is significant.

European Market Is Conservative, Reguires More In-Depth Service

By a CW Staff Writer

TULSA, Okla. – "The European is perhaps a little more conservative in his approach . . . he wants proof that you can do a good job not 100 miles away, not 1,000 miles away, but there on his doorstep," observed Douglas C. Cornwall, president of Telex International Computer Products during a recent interview.

As a result, when Telex formed its international division about 18 months ago, it decided to approach the market country by country, ensuring sufficient depth in each to do a "proper job," or not go at all.

"We've even turned down orders" from potential customers in countries we thought we wouldn't go into for quite a while," Cornwall added.

Telex now offers marketing and maintenance in the UK, Germany, France, Switzerland, and, most recently, Italy.

Telex is moving toward offering a complete product line and plans to offer leased 370s. In addition to Telex tape and disk drives, printers and 370 memories, the firm handles the Ampex line of 360 memories.

Although the concept of "buying independent" was new when Telex entered the European field, the "market is just as open to the peripheral companies as it is in the states, provided the peripheral manufacturer can offer good service and maintenance," Cornwall said.

Telex recruited its maintenance engineers before its sales staff, recognizing that good service is a prime requisite of customer retention.

When orders were obtained, "we could say we service the equipment. "This has gone over very well, because people have really appreciated it."

More Loyal?

Buying peripherals separately often "requires more thought on the part of the European DP manager" possibly than on the part of his stateside counterpart, but "European customers generally are more loyal to their supplier, regardless of who that supplier is," he added.

There are very few installations with peripherals from more than one supplier, he said.

"The European market is so fragmented, with its own customs and tariff barriers, that it's not easy to set up an organization, for example, in London and handle Sweden at the same time, if you want to do it properly," Cornwall observed.

"A lot of companies have come to Europe in the belief that if you put a man here and a man there in another country, you've got an operation. This is not the case. An end-user organization is expensive to set up. You either do the job properly or not at all," he noted.

The Telex staff in each country is comprised of nationals. "That's the only way to market over there," he added.

Announcing
FREE Seminars in

APL*PLUS®

The new and different time-sharing language that's sweeping corporate offices like wild-fire!

Get the facts . . . form your own opinion about APL*PLUS. It's faster, more powerful, and easier to program than any other time-sharing language. And if you passed high school algebra, we'll teach you how to use it . . . anywhere, through our nationwide communications network.

SEMINAR SCHEDULE

Washington	Nov. 13	Chicago	Nov. 20
Los Angeles	Nov. 14	Boston	Nov. 28
Pittsburgh	Nov. 15	Dallas	Nov. 28
Philadelphia	Nov. 16	Houston	Nov. 30
San Francisco	Nov. 16		
New York City	Nov. 20		

TO ATTEND 2-HOUR, ON-LINE SEMINAR, FILL IN AND MAIL COUPON TODAY! ►

Scientific Time Sharing Corporation

7316 Wisconsin Ave., Bethesda, Md. 20014 301/657-8220

☐ I am interested in attending your seminar in_____ I understand there is no cost or obligation. (city)

Name_____Title_____

Company_____

Company address_____

_____Zip_____

Business phone_____Ext._____

☐ Send seminar invitations to my colleague(s) listed on the attached sheet.

☐ I can't attend your seminar, but I want more information about applications in_____

Foreign Orders & Installations

Companie General Geophysique, Paris, has ordered a Control Data Cyber 70 Model 72 for seismic DP applications at its Canadian subsidiary.

The Australian National Line, a shipping company, has ordered a Honeywell Model 2050 to handle an on-line passenger reservation system and to monitor container movements throughout Australasia.

An Advanced Memory Systems add-on memory has been connected to an IBM 360/50 at Adaps Ltd., Melbourne, Australia.

An IBM 360/195 has been installed at the IBM Japan Ltd. Computer Services Center, Tokyo.

Scan Optics Inc. has made its first shipment of its 20/20 optical character reader to Mitsui & Co., Japan.

Codex Corp. has received an order for Codex 4800 data modems from the Bundesanstalt fur Flugsicherung, the West German Federal Air Administration. The modems will be used throughout the country to transmit weather and air traffic information to air controllers.

Establishments Vanden Borre has installed an NCR Century 200 system for inventory management, branch accounting, cash audit and vendor and customer accounting.

Datacrown Ltd., a Toronto service bureau, has ordered two IBM 370/168s to replace its Model 165.

The Tokyo Tomin Bank has ordered two NCR Century 300 and 178 NCR 270 financial data terminals for an on-line system to link its 58 branches with Tokyo headquarters.

Wider Use Held Back

Users 'Ignorant' of Minis in Industry

BOSTON – One of the major problems retarding greater use of minicomputer systems in the industrial field is a lack of understanding, according to D.A. Cassell of Computer Logic Inc.

Cassell, in a paper prepared for delivery here at the Northeast Electronics Research and Engineering Meeting (Nerem) this week, noted the mini has been "one of the principal contributors to a quiet revolution in systems design concepts: the distributed computer system."

But this technique has not found wider industrial use, he said, partly because of a "lack of understanding on the part of users – an appreciation of the potential and the limitations of computers and an appreciation of the problems encountered in developing such systems."

Cassell said the problem was diminishing somewhat, but the underlying basis for the problems was that most DP managers receive their training in the world of business applications and have a hard time understanding the differences in the industrial world.

"As a result," he said, "we sometimes find another type of problem – the attitude that managers are knowledgeable about computers in manufacturing as a consequence of their knowledge of business DP."

Another problem in the development of manufacturing applications for computer systems is the management of systems development.

"Automation projects, more often than not are over budget and delivered late," pitfalls which can only be avoided by careful planning, he indicated.

But, he noted, even carefully planned projects are often subject to failure.

"Many project managers do not know how to plan and control their projects. All too frequently managers are also subjected to pressures from higher levels of management that force them to take shortcuts that get them into trouble later," he said.

The 26th annual Nerem show runs Nov. 1-3 at the John B. Hynes Civic Auditorium and the Sheraton-Boston Hotel here.

Reduced Costs Seen Key to POS Growth

BOSTON – Suppliers of point-of-sale (POS) systems might not find as large a market as they expect, according to a paper to be delivered here this week at the 26th Annual Northeast Electronics Research and Engineering meeting.

An analysis of the marketplace indicates the market will not support a proliferation of suppliers, according to the paper by D.C. Leonard of TRW's Systems Application center.

There is a conflict between the cost of the POS systems currently offered and their value to the potential user, Leonard said, pointing to one principal factor: users have not analyzed the true value that POS systems can offer their operations.

Great Expectations

As a result, "unless new technology and tariff developments result in significantly reduced costs, demands for on-line POS systems might not develop as anticipated," he warned.

As an example of how retailers are not analyzing the true value of these systems, Leonard pointed to the common credit-authorization application which is becoming widely used.

"Value is generally equated to reducing credit and fraud losses," he said. However, he continued, as system costs approach the magnitude of the costs savings, the value of the system approaches zero.

"Secondly, as the losses are reduced, the relative costs of the system increase and the relative value decreases."

The result, he said, is that many retailers attempt to slash their POS operating costs as the losses are reduced. Since most costs are not proportional to usage, he said, the value "decreases."

The way to solve the dilemma, he said, is to expand the functions that can be performed by the POS systems in use.

"In this way, the value function can be extended to include other 'cost-reduction' terms and the total system's costs can be distributed over a larger base, thus reducing the relative cost assigned to each application."

Broker Orders Bunker Ramo Units

Bunker-Ramo Corp. has been awarded a contract to supply all 84 offices of E.F. Hutton & Co. with market information systems. Bunker Ramo will provide price volume and statistical data from 22 exchanges and other sources.

The Army's Safeguard System Evaluation Agency has leased a Univac 1106 for use in evaluating man's ability to efficiently operate the Safeguard technical command and control consoles.

Computer Sciences Corp. has received a three-year contract to develop information systems for the Southern California Edison Co.

McDonnell Douglas Automation Co. has received a long-term $2.5 million contract to provide financial DP services for seven hospitals operated by the Sisters of Mercy of the Union, Province of St. Louis. The hospitals will have terminals linked to the McDonnell Douglas center.

Orders & Installations

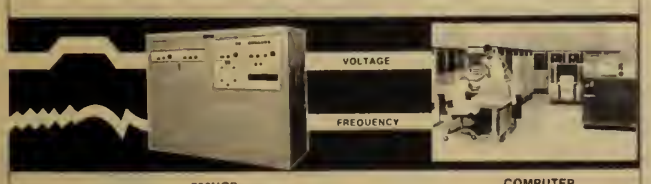
National Data Industries (NDI) will supply communications terminals and related equipment to Harvard University and the University of Massachusetts under contracts totaling $120,000. NDI will also provide on-site service personnel.

TRW, Inc. has renewed its lease with Randolph Computer Corp. for 33 months. The lease covers 24 IBM 360s and a 370.

Motorola has received a contract for 44 Totalscope II modular displays from RCA Aerospace Systems Division for use in the Air Force Tactical Information Processing and Interpretation Program.

Honeywell has received a contract from Donovan Construction Co. for systems integration of equipment for the planned freeway traffic control system of the Minnesota Highway Department.

Dataspecs Computer Services, Inc. has leased an IBM 360/30 from Com-Mark Inc.

COMPUTERS NEED
U.C.P.*
*UNINTERRUPTIBLE COMPUTER POWER
SYSTEM 700UCP PROVIDES
• VOLTAGE CONTROL
• FREQUENCY CONTROL
• TRANSIENT CONTROL
• LINE ISOLATION
• BRIDGES UTILITY POWER INTERRUPTIONS


Get the facts on
UNINTERRUPTIBLE COMPUTER POWER
Call Frank Wood (703) 355-2803
OR WRITE
POWER SYSTEMS & CONTROLS, INC
P.O. BOX 27306 • RICHMOND, VIRGINIA 23261
PSC

W. GERMANY/EASTERN EUROPE
We're an international team of E.D.P. Pro's - sales, software, service
We're looking for the right
COMMERCIAL SYSTEM
to market in the above areas.
To combine your products with our talent
Please contact us through
CW Box 3726
60 Austin Street
Newton, Mass. 02160

Quantor COMmon Sense in Inventory Control

The U.S. Navy uses Quantor COM to save gobs on inventory.
Quantor
19000 Homestead Road, Cupertino, California 95014 (408) 255-1000.
Oak Brook (Chicago) (312) 654 3720. New York, N Y (212) 279-3280.
Washington, D C (703) 960-3707. Los Angeles, Calif (714) 833-0157.
Miami, Fla (305) 448-3650. Atlanta, Ga (404) 237-1176

The Computer Caravan welcomes
ICC a milgo company
as an exhibitor in the 1973 Spring Caravan
International Communications Corporation will exhibit its line of modems for data communication at speeds from 2000 bps to 9600 bps. ICC's new LSI modem series will be featured.
What may we say about your company?
Call us: (617) 332-5606
The Computer Caravan/73
sponsored by
COMPUTERWORLD

Boston • Washington • New York • Atlanta • Houston • Anaheim • San Francisco • Kansas City • Chicago • Cleveland

Caveat Vendor

How Not to Sell Computers to the U.S. Government

By Lynn Bateman
Special to Computerworld

In general, the Federal government tries diligently to give all vendors a fair shake. However, IBM has recently won two "competitive procurements" in the government and it is most interesting to recap just how this happened.

On Oct. 13, 1971, the Army issued Request For Proposal No. DAHC26-72-R-0006 for the replacement of peripherals on 37 360/30 installed systems.

This particular procurement, called Basops, had its beginnings in February 1970 when the Office of Management and Budget (OMB) directed General Services Administration (GSA) to coordinate replacement of installed leased peripherals with plug-to-plug compatible models at lower prices than IBM charged.

In March 1971, GSA awarded contracts to implement this directive, but not to IBM.

It seems when IBM learned it had not been awarded a contract by GSA, it began to offer consolidated proposals to many government users for purchase-conversion of installed peripherals at substantial savings over IBM Federal Supply Schedule (FSS) prices.

In late spring 1971, IBM made a similar type of consolidated price proposal to the Army on Basops. IBM proposed that the Army buy all installed devices (about 340) on a five-year installment plan for about $15 million.

About that time, the now-defunct Computer Peripherals Manufacturers Association (CPMA) heard of the proposal and filed a protest with the General Accounting Office (GAO).

This protest action stiffened the government and subsequent events indicate the Army decided to conduct a competitive procurement. Accordingly, the Basops RFP was issued and a number of proposals were received.

In following these procurement activities, the reader should know only a handful of vendors, including IBM, really understand how the government procures DP equipment.

The Basops RFP was silent on two

Viewpoint

major components of a government procurement – residual value and cost of money. In the written questions and answers, one vendor asked whether residual value would be considered. The Army responded "yes" without amplification.

Residual value is the value of the equipment after the stated life cycle has elapsed. To date, no one seems to know how residual value was computed. The bidders most probably cannot answer these questions:

- What was the residual value of any offer?
- How did it compare to IBM?
- Was residual value discounted under the present value concept?
- Was IBM's residual value computed on its outright purchase plan or on its installment purchase plan?
- If on the installment purchase plan, what month was used for computation of title by the government?

Vendors were not told in the RFP that cost of money would even be a factor in cost evaluation. Yet when losing vendors were told they lost, they were informed that mandatory provisions in Army Regulation (AR) 37-13 were used in evaluation. The other vendors did not have a copy and did not know what the AR specified.

AR 37-13 required that money spent over the life cycle of a project be discounted. Thus, if Vendor X proposed purchase of all items at $10.1 million while IBM proposed a three-year installment plan at $10.7 million, IBM wins because of a discount rate applied to funds spent over a number of years.

That is what happened. A $10 million contract slipped out of the bag for the plug-to-plug vendors.

IBM knew the ground rules before it got involved in the Basops procurement. Had the other vendors done their procurement homework, the Basops procurement could have been much more competitive.

Caveat Vendors!

DCA Procurement

The case of the Reston, Va., Simulation Center procurement conducted by the Defense Communications Agency (DCA) can be called an advanced course in pulling wool over vendors' eyes.

DCA wanted a large system in the $2 million-plus range. Early in January 1972, DCA was granted a delegation of procurement authority from GSA for this equipment.

A particular vendor stayed in the competition until benchmark time, then dropped the ball. It proposed a dual CPU configuration, which passed the benchmark. This vendor also ran the benchmark with the same system less one CPU, but DCA did not tell the vendor his single CPU passed the benchmark. The vendor did not ask and the vendor did not even formally propose the single CPU system.

The RFP implied DCA wanted to buy the most powerful system it could get for $2.2 million or less. However, it was not any more specific on weighting price/performance factors.

DCA made the award to IBM for a 370/155, priced at just under $22 million. This was at least $200,000 higher than the price of the unproposed single CPU system but less than the proposed dual CPU system.

DCA awarded the contract in June 1972, added more disk units before the other equipment was installed, and added more memory. This increased the cost by approximately $629,000.

Thus, before installation, the contract was worth $2.81 million. This is much more than prices proposed by other vendors and is a blatant violation of regulations concerning equipment upgrades.

Finally, DCA awarded the total system to IBM. The numerous items such as disk packs, disk drives, core memory, tape drives and printers are available at considerably reduced costs from plug-to-plug suppliers.

The lessons to be learned are:

- GSA proved to be ineffective in review of these cases
- GSA should conduct these procurements
- The Federal agencies did not appear to put all vendors on an equal footing
- GSA should have reviewed these procurements again prior to award
- The losing vendors expended large sums of money in a futile effort to compete
- Losing vendors were generally naive and uninformed
- Before attempting to win a Federal government procurement, vendors should know the regulations governing this huge market.

Caveat Vendor!

Lynn Bateman is with Federal Marketing Counsellors, Inc., a firm that provides DP companies with advice on government procurement procedures.

From Coast to Coast, U.S. Computer users will be attending the Computer Caravan/73.

Will you?

When the Computer Caravan/73 launches its 10-city tour next February, U.S. computer users will once again be getting together to exchange ideas and keep up to date with the latest products and services. User-oriented panels, forums and workshops will provide a unique opportunity for the beneficial exchange of problems and information. And a comprehensive exhibition will display a wide variety of the latest equipment and services.

If you're a user, we'll be sending you all the information and details in plenty of time to arrange your attendance. **But if you're a marketer, now's the time to act.** Only 110 booths will be available in the Computer Caravan/73, and we expect a full house. We'd be glad to send you a free brochure – including audit figures on 1972 caravan attendance, candid quotes from exhibitors – and some very interesting sales figures. Just write or call:

Neal Wilder or Dottie Travis
797 Washington Street
Newton, MA 02160
617-332-5606
Don't wait until its too late.

The Computer Caravan/73

sponsored by

COMPUTERWORLD

Boston • Washington • New York • Atlanta • Houston • Anaheim • San Francisco • Kansas City • Chicago • Cleveland

Little Agreement On IBM's Impact In DP Industry

By Marvin Smalheiser
Special to Computerworld

LOS ANGELES – Proposals that IBM be broken up, regulated like a utility and just left alone were made by panelists at a recent meeting debating the impact of the computer giant on the industry and the user.

The three panelists, Dan McGurk, president of the newly formed Computer Industry Association; Robert Patrick, an independent consultant who has worked with IBM for many years; and Frank Wagner, executive vice president of Informatics, agreed however that IBM is probably the best run company in the world and has a lot of satisfied users.

Debating at a meeting of the San Fernando Valley Chapter of the ACM, McGurk, former president of Xerox Data Systems, urged all segments of the computer industry to get together to work out a way to handle IBM's monopoly position before economists, lawyers and legislators do it for them.

McGurk said the Justice Department has plans that would call for breaking IBM up into several separate, self-sustaining entities that would be completely integrated. He cited mainframe, peripherals and service as examples.

He said the only logical way he saw to break up IBM would be by product line, forming, for example, a computer company making 360/40s and 370/145s.

Patrick argued that IBM has been a benign influence on the industry and cited instances where its design and marketing of computers has actually helped competitors.

IBM, he said, has shown no slackening in its effort to be competitive and it is not free to increase prices at will, since users are a potent force and expect an increasing profit/performance ratio.

Wagner described IBM's dramatic growth toward a monopoly position and predicted it would be impossible to compete with it in 20 to 30 years.

But he said it doesn't make sense to break up IBM because that would be harmful to users.

first time offer!
TAX RETURN PROGRAMS
Prepare Fed & State Returns:
and Schedules on
YOUR Own IBM 360.
Full complexity returns
240-250 taxpayers per hour
Input preparation is simple;
40 taxpayers per hour
$2,000 full price!
Complete documentation.
Trouble Free.
This concept has prepared
over million returns.
COMPUTER PROCESSING
ASSOCIATES
2200 Highland Vista Drive
Arcadia, California 91006

MOVING?

Please notify *Computerworld* at least four weeks in advance. When writing about your subscription, please enclose a recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your records. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

Position Announcements

computer analysts

General Foods Corporation has openings at its headquarters located in Westchester County, N.Y. Analysts are needed with experience in the following areas.

. . . modular program design
. . . O/S MVT Internals
. . . HASP Internals
. . . Data Base Design
. . . IMS applications coding
. . . COBOL Assembler
. . . Project planning and control

Please submit resume to:
L. Schulz, (N1-1)
General Foods Corporation
250 North Street
White Plains, N.Y. 10625
An Equal Opportunity Employer

Fall Joint's dates changed. So did ours.

FJCC show dates are now December 5, 6, 7, 1972 in Anaheim, California.

Computerworld will have 3 issues covering the Joint. The new issue dates will be:

November 29th
FJCC Preview Issue
Color Closing – Nov. 10.
B&W Closing – Nov. 17.
The Preview Issue comes out the week before the Joint opens – with all the latest pre-show news.

December 6th
FJCC Show Issue Color Closing – Nov. 17.
B&W Closing – Nov. 22.
The Show Issue has early show news.

December 13th.
FJCC Wrap-up Issue
Color Closing – Nov. 22.
B&W Closing – Dec. 1.
The Wrap-up contains all the Show news . . . while it's still news.

* *Computerworld* will distribute over 4,000 bonus issues of the Preview and Show Issues during the Show.

So there are 3 opportunities for you to be at the Joint – whether your company exhibits or not.

Advertise your products or services in the:

FJCC Preview Issue . . Nov. 29th
FJCC Show Issue . . . . . Dec. 6th
FJCC Wrap-up Issue . . Dec. 13th

Contact Judy Milford at (617) 332-5606 for rates, etc. or contact the *Computerworld* Sales Office nearest you.

COMPUTERWORLD

Vice President—Sales: Neal Wilder. **Sales Administrator:** Dottie Travis, Computerworld, 797 Washington St., Newton, Mass. 02160. Tel: (617) 332-5606.

Northern Regional Manager: Robert Ziegel, Computerworld, 797 Washington St., Newton, Mass. 02160. Tel: (617) 332-5606.

Mid. Atlantic Regional Manager: Donald E. Fagan, Computerworld, Suite 1511, 225 W. 34th St., New York, N.Y. 10001. Tel: (212) 594-5644.

Los Angeles Area: Bob Byrne, Robert Byrne & Assoc., 1541 Westwood Blvd., Los Angeles, Calif. 90024. Tel: (213) 477-4208.

San Francisco Area: Bill Healey, Thompson/Healey Assoc. 1111 Hearst Bldg., San Francisco, Calif. 94103. Tel: (415) 362-8547.

POSITION ANNOUNCEMENTS

Customer Service Engineers

Positions are available in major cities throughout the U.S. for customer engineers with systems field service experience on large scale commercial computers and all related peripheral equipment.

Be a part of this vigorous growth and realize your maximum potential within your career field. You'll need a minimum of 2 years applicable experience.

Bill Gill AND ASSOCIATES
5518 W. DIVERSEY AVE.
CHICAGO, ILL. 60639
OFFICE (312) 736-6836

PROGRAMMER - ANALYST

We are searching for a person with the following qualifications:
*Minimum one year experience writing COBOL.
*Self-starter – one with the ability to handle a project from conception thru implementation.
*Familiar with manufacturing and associated financial applications.
*BOMP or DBOMP desirable.

We offer the following considerations:
*IBM 360/40 with 128K.
*Operating under DOS and POWER.
*Up to $12,500.
*Excellent fringe benefits.
*Location in resort area of Western Michigan with excellent schools, housing, and recreational facilities.

Send current resume with salary schedule to:
HOWMET CORPORATION
Misco Division
One Misco Drive
Whitehall, Michigan 49461
Attn: Mr. Mason Archer
An Equal Opportunity Employer

Computer Software Salesman

New York, Chicago, St. Louis areas
A.D.R. The Software Builders offers:
- Multiple Products
- Existing Customers
- Established Prospects

Salary & Commissions
Expenses & Benefits
Send Resumes to:
Ronald J. Davis, Nat'l. Sales Mgr.
APPLIED DATA RESEARCH, INC.
Route 206 Center
Princeton, N.J. 08540
An Equal Opportunity Employer

Dynamic California-Based Health Services Company offers opportunity to participate in new health care delivery program:

MEDICAL COMPUTER PROGRAMMER AND ANALYST--

A minimum of 3 years in the field with specific background in medical data base development and medical administration and a working knowledge of alternative health delivery systems are required. POMR and HIS/MISP exposure is desired. Salary is open and will be commensurate with ability and experience. Send complete resume with references and salary history and requirements to:

CW Box 3727, 60 Austin St., Newton, Mass. 02160
We are an Equal Opportunity Employer.

MARKETING MANAGER PERIPHERAL EQUIPMENT

Data General Corporation, maker of the Nova line of mini-computers, is aggressively penetrating the peripheral equipment business. We're already mass producing discs and cassettes and we'll introduce several important new products in the next few months.

We're looking for someone to define peripheral products, markets, and goals.

A degree and five years of experience marketing peripherals are required.

Send your resume with salary history to Ken Kimball.

DATA GENERAL CORPORATION
Southboro, Massachusetts 01772
An Equal Opportunity Employer

SALES REPRESENTATIVES
Computer Peripheral

FABRI-TEK INC., a major supplier of computer core memory stacks and systems, is experiencing rapid, stable growth which dictates the expansion of its sales team. We are seeking several experienced computer peripheral Sales Representatives for various areas within the United States.

These positions mean hard work and responsibility. They require dynamic, highly motivated & results-oriented individuals. If you have at least 2 years experience in selling to the End User market in the computer industry, want an extremely competitive salary plus commission, growth opportunity with a multi-division, diversified growth corporation, we should sit down and talk. Local interviews will be arranged. Call COLLECT, or send resume and salary history to: D.A. POSTHUMUS

MEMORY PRODUCTS DIVISION
5901 South County Road 18
Minneapolis, Minnesota 55436
An Equal Opportunity Employer

OS SYSTEM programmer

Interested In Practical Applications As Well As Theory?

Join Gilbert Associates, Inc. . . . . .

a major consulting engineering firm engaged in the design of nuclear and fossil fueled power plants, and other significant areas of engineering.

We need an individual with solid OS background and a B.S. in a technical discipline. Must be experienced in modifications sysgens and other system programmer tasks on IBM operating systems. Long term responsibilities will include system support of a technical data base, terminal system, and sophisticated engineering problems.

You'll enjoy an excellent salary and benefits package. For a comprehensive review of your professional qualifications, you are invited to send your resume, with confidence that your interests will be treated in a private and privileged manner to: FRANK F. LASIK. Dept. 108

Gilbert Associates, Inc
ENGINEERS AND CONSULTANTS
P.O. Box 1498 A Reading, Pennsylvania 19603
An Equal Opportunity Employer

POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS

COMPUTER LEASING REGIONAL MANAGER based in ATLANTA, GEORGIA

Require agressive individual with knowledge of 360 leasing. Responsibilities will include the leasing of 360 equipment in Southeastern United States as well as sale and lease of computer related products. Excellent salary, incentive, override.

For appointment in Atlanta call:
Mr. Albert Berman, President
GRANITE COMPUTER LEASING CORP.
Benson East
Jenkintown, Pa. 19046
(215) 885-4990
AN EQUAL OPPORTUNITY EMPLOYER
MEMBER COMPUTER LESSORS ASSOCIATION

TECNICAL EDP POSITIONS

GTE Data Services needs a number of key technical people at our corporate headquarters in Tampa, Florida. Responsibilities include software development and evaluation (special purpose, generalized and macros), computer and data center simulations (using SCERT and GPSS), and teleprocessing design and programming.

Ideally, candidates should have five years experience in one or more of the following areas: project leadership, system engineering, systems design and programming (Assembler, Cobol). This experience should be related to large scale, multi-center computer systems, preferably IBM.

Call or write (Mrs.) Tannia Macias, Employment Representative, GTE Data Services Incorporated, P. O. Box 1548, Tampa, Florida, 33601, (813) 877-8021.

"AN EQUAL OPPORTUNITY EMPLOYER M/F"

GTE DATA SERVICES

COMPUTER PERIPHERAL SALESMEN

Tektronix, Inc., Manufacturer and distributor of GRAPHIC COMPUTER TERMINALS and associated hardware and software, is seeking experienced peripheral or mini-computer salesmen for territories throughout the United States.

Salaries are based on experience. Company car provided. Benefits include liberal profit sharing, education and insurance programs.

To assure prompt, confidential consideration of your background for these positions, please call COLLECT to Ron Elarth, Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97005. Telephone (503) 644-0161.

TEKTRONIX, INC.

An Equal Opportunity Employer

BUY SELL SWAP

2311 TYPE DISK DRIVES

$4,500 a piece
2 for $8500

Thomas Computer Corp.
625 N. Michigan Ave.
Chicago, Illinois 60611
(312) 944-1401

360 System For Lease

2030-65K CPU (Loaded)
1051, 1052
2540, 2821, 1403 (N1)
2841, 2311's & 2401's
CALL OR WRITE:
DATA AUTOMATION
4858 Cash Road
Dallas, Texas
(214) 637-6570

$ $ $ $ $ $ $ $

FOR SALE

Immediate Availability
1440 System-8K
1311-II Discs
WANT TO BUY
360/20- C-2 CPU

CAC
Dept. 'A' - P.O. Box 80572
Atlanta, Ga. 30341 (404) 458-4425

FOR SALE OR LEASE

024-$350; 026-$1200; 056-$350; 077-$750; 082-$900; 083-$2700; 085-$1900; 402-$1300; 403-$1500; 407-$4200; 514-$1300; 519-$1600; 548-$2000; 552-$1700; 557 $3500; 602-$400; 2311 (1)-$5,500 729 (5)-$4500; 729 (6)-$6000; 2311 (1)-$6500; 1448 (1)-$1500; 1401-C6-16K system-$40,000.

THOMAS COMPUTER CORP.
625 N. Michigan-Suite 500
Chicago, Ill. 60611
(312) 944-1401

WANTED TO BUY OR TRADE

NCR 395, 400
Burroughs L2000
E4000, E6000
IBM 029, 1060, 1201
Call Stuart Rubenstein

I.O.A. DATA CORP.
383 Lafayette St., NYC 10003
(212) 673-9300

we buy and sell
IBM Computer Systems
& Unit Record Machines
NCR 31-32-33 Etc.
Burroughs – Fridens
marion
403 Broome Street
New York, N.Y. 10013
(212) 966-5931

COMPUTER SAVINGS BUY-SELL-LEASE

DEI

DATA EQUIPMENT INC.
3306 W. Walnut Suite 304
Garland, Texas 75042
(214) 272-7581

BUY SELL SWAP

WANT TO BUY IBM 360/40

Components	Description
2040 G	128K CPU
3237	Dec. Arith.
4427	Floating Point
7520	Storage Protect
6980	1st Selector Channel
7920	1052 Adapter

CW Box 3722
60 Austin Street
Newton, Mass. 02160

FOR SALE

Adds Model 880 CRT
And
Cassette Tape Unit
Excellent For Data Input
And Retrieval
Contact: Bill Barrett
(213) 478-4011

ACS
360-40/G
NOVEMBER
360-30/F
FEBRUARY
PRICED TO SELL

ACS Equipment Corporation
8928 Spring Branch Drive
Houston, Tx 77055
(713) 461-1333

WANTED TO PURCHASE

2501 B2	Card Reader
1442 N2	Card Punch
2821-2	Control Unit With 3615 & 8637
1403 N1	Printer
2803-1	Tape Control
2402-2	Magnetic Tape Unit Nine Track

CIS CORPORATION
700 East Water Street
Syracuse, New York 13210
(315) 474-5776

Want to Buy for Cash

IBM 360-50

Bids to be opened
Nov. 6, 1972
For bid forms
& specifications,
write or wire:
Claude A. Zachry,
Purchasing Agent
412 Harris County Courthouse
Houston, Texas 77002

For Sale

UNIVAC 1005 IIC

80 column with punch
Excellent cond. ready for M/A

We buy-sell-lease and service
IBM & Univac equip. all models

UNIT RECORD SERVICE CO.

84 Cummings Park
Woburn, Mass. 01801
617-935-6340

FOR SALE OR LEASE

Memorex 2311's
for 360-20
Sale $2,500 each
Lease $150 month
Available immediately
To Buy-Sell-Lease
Call Collect or Write to:
Computer Systems/
Graphics, Inc.
20 West 9th Street
Kansas City, Mo. 64105
(816) 474-4690

FOR SALE OR RENT

Imediate Delivery
024 Key Punches
056 Verifiers
083 Sorters
085 Collators
Data Processing
Supply Corp.
9 West 61st Street
New York, N.Y. 10023
(212) 765-5400

FOR SALE

407-A3-MA. -$4200.00
519-MA-with 27 positions of Mark Sense-$2200.00
026 -with Dura Card to Tape -$2200.00
632 MA-w/026 output & 024 Input -$1900.00
Complete line of Unit Record Machines available. Also Moore Burster.
Computer Products Company
529 W. Third St.
Cincinnati, Ohio 45202
(513) 721-3399

THE HALSEY CORPORATION

wants to buy IBM
1400 and 360 Series
Systems and Peripheral
Equipment
THE HALSEY CORPORATION
1367 Central Avenue
Middletown, Ohio 45042

Disk Packs and Cartridges Wanted to Buy

We also Sell and Lease New and remanufacturered Brand Name Disk Packs and Disk Cartridges.
Used Computers Inc.
14 S. Bryn Mawr Ave.
Bryn Mawr, Pa. 19010

Attn: Neil L. Houghton
(215) LA5-7648

ECONOCOM

FOR SALE 360/20
2020-D2, 1403-2, 2560-A1, (2) 2311-11's.
WANTED
1130's, will pay a top price for your 1130 today!
ALSO WANTED:
1316 Disk Packs

ECONOCOM DIVISION OF COOK INDUSTRIES. P. O. BOX 16902
2221 DEMOCRAT RD. MEMPHIS, TN. 38116 PHONE 901/396-8600

WANT TO BUY

360/40 H
also 2821, 1403 N1
2540, 2314-1, 2260-1
CW Box 3726
60 Austin Street
Newton, Mass. 02160

FOR SALE

2314-001 $80,000
with 8170
Two Channel Switch
Summit Computer Corp.
785 Springfield Avenue
Summit, New Jersey 07901
(201) 273-6900

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

IBM 360
BUY...SELL...LEASE
CALL
CEI

IBM 360/30 E & F CPU's (Nov. & Dec.)
IBM 360/40 G's (Dec. & Jan.)
1419 Reader 2312 A1 Disk
2401 Tapes 1, 2, 3 & 6
360/50 H (Jan.)
IBM 360/30 32K Core 1.5 mlc. Immed

CEI – The ORIGINAL COMPUTER EXCHANGE
THE COMPUTER EXCHANGE INC.
11 GRACE AVENUE,
GREAT NECK, N.Y. 11021
516 466-6500

WANTED
TO BUY
OR LEASE

Computer Letter Package for System 3
Send information to:
Letter Writing
P.O. Box 4949
Memphis, Tennessee 38104

FOR SALE
NEW ADD PUNCHES

Have 2 two-month old ADDO-X 10 Key Add Punches for sale at substantial discount from Manufacturer's Purchase price. Input units Model 20 & punches are Model 42. Must sell due to customer desire to change systems. Will lease at substantial discount, or sell outright.

Contact:
S. Harland
Richland Leasing
P.O. Box 12
Columbia, S.C. 29202
Phone (803) 254-1496

360 'BUY' 'SELL' 'LEASE' 'SUBLEASE'
360/40 H
2314-1
Available Now
Sale or Lease

LUNCEFORD & ASSOCIATES
Valley View Bank Bldg.
Overland Park, Kan. 66212
(913) 381-7272

WANTED
360/30
1401
360 PERIPHERALS

Corporate Computers Inc.
420 Lexington Ave
New York, N.Y. 10017
(212) 532-1200

Available from Owner
2040 G, GF or H

Available December 1972. 1 year or longer.

Savings of at least 35% on one year contract – greater savings on longer agreements.

Peripherals also available. Owner pays installation and transportation. IBM Maintenance Qualification guaranteed.

CW Box 3729
60 Austin Street
Newton, Mass. 02160

360/65 AVAILABLE

360/65I available December delivery. Will also supply as 360/65H. Lease, sale, or lease with purchase option.

360/50 AVAILABLE

360/50I available for immediate delivery. Will sell, lease, or lease with purchase option. CPU available as 50H or HG. 128K or 256K core also available.

IPS COMPUTER MARKETING CORP.
(201) 871-4200
467 Sylvan Ave., Englewood Cliffs, N.J. 07632

FOR SALE
OR LEASE

Burroughs B3500 System
P.O. Box 3985
San Francisco, Calif. 94119

FOR SALE
IBM 2401-3 (90KB, 800 BPI)

Acceptable for IBM M/A blue accent pannels, imediated delivery, FOB New York City, 7 track unit price $4,750. 9 track unit price $7,250 – or attractive lease – special deal available when two or more units are furnished with loaded 2816 tape switch.

Summit Computer Corp.
785 Springfield Avenue
Summit, New Jersey 07901
(201) 273-6900

DATASERV equipment inc.
BUY - SELL - LEASE
All Model 360 Systems/Components
1401 Systems
WANTED TO BUY
360-30's 1.5 and 2.0 usec
2415-1, 1442-N1
FOR SALE
1419-1 Mag. Char. Rdr.
1203-2 Unit Inscriber (Qty. 7)
Avail Immed. 64K Mod 40 Core
phone (612) 546 4422
400 shelard plaza mpls minn. 55426

I.O.A.

Immediate Availability
Fully Reconditioned in our factory. Approved for IBM/MA.
088 COLLATORS
024, 026, 029, 056, 059, 063, 077, 082, 083, 084, 085, 402, 403, 407, 514, 519, 552, 557, 602, 632, 802
Also computers & Drives

I.O.A. DATA CORP.
383 Lafayette St., NYC 10003
(212) 673-9300

FOR SALE

Century 100 w/32K and I/O Writer, installed 1970. Asking $88,150.00. Also, 44 Disc Packs (Model 655), delivered to us October, 1972, for $225.00 each. All equipment available May, 1973. WE ARE UPGRADING.

First National Bank
Great Bend, Kansas 67530
(316) 792-1771

SYSTEM 360/370 | dearborn computer leasing corporation

A business relationship you can't afford to be without . . .

- Lease Terms to Fit Your Needs
- Field Engineering Support
- Systems Engineering Support
- Well Trained Marketing Staff
- Buy and Sell-360s
- Subleasing
- Member, Computer Lessors Association

Dearborn Computer Leasing Corporation
a subsidiary of Dearborn-Storm
4849 North Scott Street / Schiller Park, Illinois 60176 Area 312 / 671-4410

WANTED
BATCH ORIENTED
SOFTWARE
FOR ORDER PROCESSING AND INTEGRATED BUSINESS SYSTEM TO PROVIDE ELECTRICAL, PLUMBING, HEATING, AIR-CONDITIONING
WHOLESALE DISTRIBUTOR
WITH
- DAILY BATCH INVOICING
- MONTHLY STATEMENTS
- PERIODIC REPORTS

- SALES ANALYSIS
- PURCHASE ORDER LISTING
- GENERAL LEDGER
- ACCOUNTS RECEIVABLE
- INVENTORY ANALYSIS
- ACCOUNTS PAYABLE

WRITE
CW BOX 3731
60 AUSTIN STREET
NEWTON, MASS. 02160

BUY·SELL·LEASE

System/360's 1130's

Are you considering buying, selling, or leasing your data processing equipment? Consider Econocom. Our staff of highly trained professionals offers expertise in all areas. Buy, Sell, or Lease.
Contact us today – let us show you how we can help you gain the most from your data processing investment.

ECONOCOM A DIVISION OF COOK INDUSTRIES INC
P. O. Box 16902 · 2221 DEMOCRAT ROAD
MEMPHIS TENNESSEE 38116 · PHONE 901-396-8600

FOR SALE
IBM
1404 PRINTER

Cost New: $84,750.00
Written bids required by November 30, 1972
Beach Computer Corp.
4932 Main Street
Downers Grove, Ill. 60515
(312) 852-1308

On a computer, nothing wears down but the price

IBM TAPE DRIVES
FOR SALE

2402-2 (two 60KB Drives)
2803-1 (tape Control)
Immediate Delivery
IBM Maintainence
Purchase: $20,000 (save 70%)
Rental: $900/month (save 37%)

FORSYTHE McARTHUR ASSOCIATES INC
Twenty-first Floor
919 North Michigan Avenue
Chicago, Illinois 60611
Telephone: (312) 943-3770

Please send me additional information on all available 360 systems.
Name _____
Title _____
Address _____
_____
City _____ State _____ Zip _____

TLW COMPUTER INDUSTRIES
3570 American Drive, Atlanta, Georgia 30341, (404) 451-1895
222 East Wisconsin Avenue, Lake Forest, Ill. 60045, (312) 295-2030

BUY YOUR 360 FROM
*THE FULL SERVICE ORGANIZATION
*Engineering *Installation
*Reconditioning *Transportation
Available Immediately
360/30 32 or 64K
1419 MICR Reader/Sorter Complete I/O Set
360/50 Core- 256K

Before you Buy—Lease—Sell
360/65
or any 360 or 370 equipment
call or write

COMDISCO, INC
2200 East Devon Avenue
Des Plaines, Illinois 60018
Telephone 312-297-3640

we have a new concept in leasing

BUY SELL SWAP

FOR SALE OR LEASE
IBM 2311
Disk Drives
IBM 1401
4K to 12K Systems
Savings
in the Thousands.
D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
CALL (212) 925-7737 Ext. 1

Wanted IBM 360's

All models
and components wanted.
Free Appraisal.

ABLE COMPUTER INC.
625 Bard Ave.
Staten Island, N.Y. 10310
212-273-3721

Sale or Lease
3-2311-1 1401-B3
1401-1402-1403
Immediate Delivery
On IBM Maintenance

WANTED
026-029-083
Stock Forms
14 x 11 3000 cases
3&4&5 part $11.50 per case
Also Tab Card Files
(617) 987-0185

WANT TO BUY 360/65

CW Box 3726
60 Austin Street
Newton, Mass. 02160

BUY SELL SWAP

FOR SALE

IBM 2361 LCS Mod 2, Two Million Bytes, Serial No. 10023. Unit has been under continual IBM maintenance and has all currently available engineering changes installed. Available January, 1973. Minimum bid $162,000. Sealed bids will be accepted in Purchasing Department, University of California, Santa Barbara until 3 p.m. 11-17-72. For information on equipment call A/C 805 961-2261. For bidding documents and instructions Call A/C 805 961-2588.

360/22 USERS

IBM 360/22 with core, tapes, disks and I/O supplied by National Computer Rental
substantial savings
Contact:
J. Phelan or T. McArdle
420 Lexington Avenue,
NYC 10017
(212) 532-1500

Current Inventory
SALE

All this Unit Record Equipment in stock and ready to ship at money saving sale or lease prices.

RARELY OFFERED 046, 029, 059, 407, A3, 548, 557, 087, 088
OTHER FINE MODELS: 024, 026, 056, 077, 085, 402, 403, 407, 514, 519, 523, 552, 602, 604, 521, 826

D.P. Equipment Marketing Corp.
260 W. Broadway, N.Y. N.Y.
(212) 925-7737 Ext. 1

BUY SELL SWAP

WANTED
026's — 029's ALL MODELS —
083's — 084's
360's-20's-30's-40G
FOR SALE/LEASE
2020 — BC1 — 2560 — 2203
2020 — BC2 — 2520
2501 — 1403-2
CROSS COMPUTER CORP.
505 Northern Blvd.
Great Neck, N.Y. 11021
Call — Bob Ottes (516)487-9812
In Philadelphia
Call — Jay Goldfarb (215)568-6620
360/370 LEASE
FINANCING AVAILABLE

WANTED
029 KEYPUNCHES
ALL MODELS
WE PAY TOP DOLLAR

CMI CORPORATION
16225 East Warren Avenue
Detroit, Michigan 48224
(313) 889-0440

FOR LEASE BY OWNER
IMMEDIATELY
360/40
(G or H)
WITH 1/O SET

(Peripheral available if desired)
Contact: Harry Blair
C.I.C.
P.O. Box 88047
Houston, Texas 77004
(713) 524-8249

IBM 360/50 H FOR SALE

Available Dec. 1, 1972
Features: (256K) 6980, 6981, 7920, 2 Channels with 1052-7.
For additional information call (415) 965-0800 Mr. George Bergst.
Principals Only Please
Written bids required by Nov. 15, 1972
Marked "Bid Control" to:
Technicon Medical Information Systems
590 E. Middlefield Road
Mountain View, Calif. 94040

IBM TAPE DRIVES

Available for 90 day leases or longer.

Most Models available for immediate delivery with or without control units. Savings of at least 50% including maintenance on one year agreements — greater savings on longer terms. Owner pays installation and transportation on one year or longer leases. Guaranteed qualified for IBM Maintenance.

CW Box 3728
60 Austin Street
Newton, Mass. 02160

BUYING? SELLING?
Contact:
GREYHOUND
Write:
Manager of Brokering
Greyhound Computer Corp.
Greyhound Tower
Phoenix, Arizona 85077
or Call
(800) 528-6024 Toll Free
FOR SALE
360 Systems
GE 415

BUY SELL SWAP

FOR SALE IBM UNITS
1401 Tape System
16K CPU Loaded
7295 Tape Drives
1620 Card System
System 3 Units
Bi-Sync. Communications
Dual Feed Carriage
Data Recorder
Sorter
Call: (617) 227-8634
We Buy any Computer Peripheral or Teletype
Send for Free Price List
AMERICAN USED COMPUTER CORP.
15 School St.,
Boston, Mass. 02108

OAS
FOR SALE OR LEASE
360/20/30/40 CPU's & Systems 1401, 1440, 1620, 2311, 2841, Univac 9200 System
All Types Unit Record
LEASE OR LEASE PURCHASE
Two 1401-16K with 729's
One 1401-12K with 729's
CALL or WRITE
Data Automation Services, Inc.
4858 Cash Road
Dallas, Texas 75247
(800) 527-6148
318 W. 28th Street
Los Angeles, Calif. 90007
(213) 747-0587
7750 N.W. 7th Avenue
Miami, Fla. 33150
(305) 693-3911

2311 and 2314 USERS:
YOU'RE PAYING TOO MUCH!

TBI has purchased the entire line of XLO/Bryant disk drives.
IBM compatible with 2314, 2319 and 2311.
Immediate delivery; nationwide maintenance.

tbi®
Prices for lease or purchase are lowest in history. Call any TBI office today.
TBI Equipment Div.
Time Brokers, Inc., 500 Executive Blvd.
Elmsford, N.Y. 10523, (914) 592-4065
Nationwide broker/dealers of DP equipment & computer time
Boston, Chicago, Elmsford, N.Y., Los Angeles, New York City & Washington, D.C.

'NCR Century 100'

For Sale — By Owner
NCR Century 100 — Immediately Available
Must make room for Century 200
"16K or 32K Memory"
1 Dual Integrated Disc Unit — 300 cpm Card Reader
450/900 lpm Printer — I/O Typewriter
Will sell on lease/purchase basis for creditworthy purchaser
For more information Write:
Mr. A.R. Naunheim, President,
Charter Bank of Jennings
6605 W. Florissant Ave., Jennings, Missouri 63136
(314) 389-5500

INTRODUCING.....FTP
360/20

Econocom announces a Fixed Term Plan for Models of the IBM 360/20 CPU. If you now have your peripherals under the IBM FTP, Econocom can offer the same short term benefits and savings for your CPU. For details call or write . . .

ECONOCOM A DIVISION OF COOK INDUSTRIES INC
P. O. Box 16902 • 2221 DEMOCRAT ROAD
MEMPHIS TENNESSEE 38116 • PHONE 901-396-8600

FOR SALE BY OWNER

370/145 213 or 262K
December

360/30 32K	360/40 128K	360/30 32K
January	Full complement of features December	Full complement of features February

CONTINENTAL INFORMATION SYSTEMS
700 East Water Street
Syracuse, New York 13210
(315) 474-5776

BUY SELL SWAP

PERIPHERAL EQUIPMENT FOR SALE

CDC 9200 slightly used card reader for sale. Best offer will be accepted.

TRANSDUCER SYSTEMS, INC.
710 Davisville Rd.
Willow Grove, Pa. 19090
(215) 657-0800

20 Wright Line cabinets for sale 20 drawers

No reasonable offer refused.
A Supplementary Data Processing Service Inc.
201 743-4570

--SALE--
IBM 2803-02

Single Channel Tape Control
1600 BPI
Available December 1, 1972
$18,750 net
Call — George McLaughlin
(201) 273-6900

SUB-MODEL 5
IBM 360/20

2020 E5 (32K) CPU	1403 2 Printer
2152 1 Console	2311 11 Disks (3)
1442 5 Card Punch	IBM/MA
2501 A2 Card Reader	Available - 90 Days

ECONOCOM A DIVISION OF COOK INDUSTRIES INC
P. O. Box 16902 • 2221 DEMOCRAT ROAD
MEMPHIS TENNESSEE 38116 • PHONE 901-396-8600

FOR SALE OR LEASE

Plug-to-Plug Replacement
For IBM 2311 Mod 01, 11, 12

Immediate Delivery
Nationwide Maintenance

Call Your Offer to:
D.S., Inc.
(512) 926-1179

Are You Upgrading Your Present Tab System?
Are You Planning to Order A Computer?

We have for sale a Univac 9200 8K Card System with Multiply, Divide, Edit Hardware which will be maintained by Univac.
Why not buy at a discounted price and save?
For full details contact:
CW Box 3732
60 Austin Street, Newton, Mass. 02160

BUY SELL SWAP

Tape Drive Specialists

We buy, sell and lease used IBM 360 Tape drives and controllers. For more information, call or write:

HNB Marketing Co.
3505 Knight Street
Oceanside, N.Y. 11572
(516) 536-8338

FOR SALE

7074 System w/Tapes
360/50's 360/40's 360/30's
2404-2 Tape & Control
Also Immed. Available:
For Sale or Lease
1401-C3 System
Frank J. Williams

BOOTHE COMPUTER MARKETING, INC.
555 California St.
San Francisco, Calif. 94104
(415) 989-6580

360/30

Owner has 32 or 64K system available for lease for one year or longer. Savings of at least 45% – larger savings for two year or longer lease.

I/O and peripherals also available at comparable savings.

Guaranteed for IBM Maintenance. Available December 1972.

CW Box 3730
60 Austin Street
Newton, Mass. 02160

WANTED FOR IBM 370/155

3360-3 Processor Storage
1433 Feature (Third BMC)
J to JI Model Upgrade

WILL PURCHASE OR LEASE
IBM OR EQUIVALENT

Contact: Harry Blair
Computer Installations Corp.
P.O. Box 88047
Houston, Texas 77004
(713) 524-8249

QUALITY IS WHAT WE'RE ALL ABOUT!!!

The results? International leadership in the purchase and sale of IBM 360/370 computer systems. If you are considering the purchase or sale of used IBM equipment, find out why ICX is the international leader in this highly specialized business. Why are we so concerned with quality? Because we think that doing business with you should be a forever thing.

- **Lower Costs**
- **Guaranteed IBM Maintenance Agreement**
- **Fully Reconditioned**
- **Timely Delivery**
- **Site Engineering**

Write or phone for details:

Pat Baker—Domestic/
Dale Lewis—International
ICX Group Headquarters
1660 L Street, N.W., Suite 201
Washington, D.C. 20036
(202) 466-2244

ICX

Time for Sale

NEW JERSEY

SYSTEM/3

- Time Available - All Shifts
- Complete Keypunch Support
- Located Near Gdn. St. Pkwy.
- 1100 LPM Printer

IFA
Tel. Don Thee
(201) 272-4350
IFA Computer Services, Inc.
Cranford, N.J.

S/360/50/40/30
1287
2671 Paper Tape Reader
ALL SHIFTS

Call: Roy Einreinhofer
Popular Services, Inc.
(201) 471-2577

ILLINOIS

IBM 360/50 USERS:
The Cost of Computer Time Just Went Down
(and the quality went up!)

360/50 512K, 7-2401 M6 (9T, 800/1600BPI), 2-1403 N1, 1-2540, 2314

	8 AM-8PM	8PM-8AM
Weekdays	$65/HR	$55/HR
Weekends	$45/HR	

1403 OFF-LINE PRINTING

Call: Dan Grey or John Davidson
(312) 583-5410

Golden fifty
COMPUTER SERVICE DIVISION
5320 N. Kedzie Ave. • Chicago, Ill. 60625

IBM 360/370 USERS
Computer Time Available

370/155	1024K, 3330, 2 2314's 10 3420's, O/S or DOS	
	8am-8pm	8pm-8am
Weekdays	RJE	RJE
Weekends	RJE	$90/hr.
360/65	1536K, 3330, 2 2314's 10 3420's, OS or DOS	
	8am-8pm	8pm-8am
Weekdays	Not Avail.	$110/hr.
Weekends	$80/hr.	$70/hr.
12 hr. blk. weekend	$70/hr.	$60/hr.
360/50	512K, 2314, 6 3420's	
	8am-8pm	8pm-8am
Weekdays	$100/hr.	$65/hr.
Weekends	$45/hr.	$40/hr.
12 hr. blk. weekend	$40/hr.	$35/hr.
360/30	64K, 5 disk, 6 tape	
	8am-8pm	8pm-8am
Weekdays	$50/hr.	$40/hr.
Weekends	$33/hr.	$27/hr.

CALL: RON ELLIS (312) 922-6141

the computer research company
141 W. Jackson Blvd.
Chicago, Ill. 60604

TIME FOR SALE

NEW YORK

SYSTEM 3, 360-20
Time
Keypunching
Card & Program Conversion
Reasonable Rates
ANCHOR SYSTEMS, INC.
(212) 571-0905

IBM 360/30

96K, 2314 9 MODULES
1403 - N1 PRINTER 1100 LPM
2 - 2402 TAPE DRIVES
2540 CARD READER

PAN AM BUILDING
WHOLE SHIFT AVAILABLE

CONTACT:
ROBERT F. SYVERTSON
212-973-8767

COMPUTER TIME AVAILABLE

We are Brokers for IBM, RCA, etc.
LOW RATES

COMPUTER RESERVES
393 Seventh Ave., NYC
594-7935

CALIFORNIA

Computer Time Available 360-30

All shifts - Any day
64K - 1100LPM - UCS
180KB - 1600BPI
Dual Density, 2314 Disk
Write or Call
Gary Fox
2024 J Street Suite 2500
Sacramento, Calif. 95814
446-7814 or 446-7815

Software for Sale

Try EASYTRIEVE
free for 30 days

New generalized retrieval and reporting package. IBM 360/370 DOS or OS. Free form English language. No compile, no assemble. I/O speed. Over 75 satisfied users. $6,000. A product of:

Ribek Corporation
Montgomery Center
8630 Trenton Street
Silver Spring, Md. 20910
(301) 587-0115

Also available through:
International Systems
King of Prussia, Pa.

*General Ledger

*Accounts Payable

Management responsibility reporting. Multiple company processing. Chart of accounts independence. Installed in 5 days.

ANCOM
...The Financial Systems Firm

San Diego, 1250 Sixth Avenue (714) 238-1242

New York	(212)489-1660
Dallas/Fort Worth	(817)738-2151
Honolulu	(808)955-6631
Chicago	(312)986-1346
Los Angeles	(213)649-1616
Cincinnati	(513)961-0776

SOFTWARE FOR SALE

Is $960 Too Cheap? How About $62/Month?

That's all we charge for our SUPER/PAY Payroll System. A very comprehensive system ordered by over 30 top firms in the past year, who liked SUPER/PAY's features as well as price.

-All COBOL — 48K or above
-Variable or fixed input
-Disk or tape-IBM or others
-State and local taxes
-DOS or OS
-Unlimited deduction & earnings
-Vacation and sick leave acctg.
-Skill & education profile
-Outstanding documentation
-30 day free trial

Try the system as others have and we know you will like it. Ask about our General Ledger Accounts Payable & Receivable available on the same plan.

Call or Write Today
Datalease Corporation
6430 Sunset Blvd.
Los Angeles, Calif. 90028
(213) 461-4888

MMS GENERAL LEDGER

is hard at work for over 40 of the biggest US corporations* TO FIND OUT WHAT THEY KNOW THAT YOU DON'T, CALL:

Boston	617-272-2970
New York	212-972-9540
Chicago	312-256-2250
Atlanta	404-255-0039
Los Angeles	213-622-3996
San Francisco	415-421-0426

Software International Corporation
279 Cambridge Street
Burlington, Ma. 01803

*so are Accounts Receivable, Accounts Payable, Inventory Management packages.

You Deserve the Best !!

...and you get it, with PHI's PAY II, the most powerful Payroll/Personnel Management Information System available.

- PAY II is the only package that is custom generated to accommodate your unique processing needs
- PAY II allows weekly, bi-weekly, semi-monthly, monthly, or user-specified pay periods
- PAY II provides up to 99 earning and deduction categories per pay category
- PAY II provides 6 level breaks within 20 characters permitting use of social security number identification
- PAY II provides up to 99 constant rates and references for common calculations
- PAY II incorporates a separate tax module – PHITAX, which assures accurate and fast implementation of tax changes
- PAY II includes an extremely powerful custom reporting feature
- PAY II users receive extensive training, one year of free maintenance and detailed documentation
- PAY II lets you print your checks and reports at remote terminals
- PAY II incorporates all the flexibility and basic processing flow of our original PHI Generalized Payroll System the system that operates in over 120 banks and corporations and produces one out of every 20 paychecks issued in the U.S.

IBM 360 ANS COBOL

For more information about PAY II, contact James Lees at (617) 648-8550.

PHI COMPUTER SERVICES, INC.
24 MILL ST. ARLINGTON MASS. 02174
1138 ENGLANDER ST. SAN PEDRO, CALIF. 90731

SOFTWARE FOR SALE

ACCOUNTS PAYABLE
PAYROLL/PERSONNEL

Modular, flexible systems with multi-company capabilities. Presently functioning for a variety of users. Complete, detailed documentation provided.

ARGONAUT INFORMATION SYSTEMS, INC.
P.O. Box 112
Walnut Creek, California 94596
Telephone: (415) 937-4675

asystance
THE FINEST GENERAL LEDGER AND FINANCIAL REPORTING SYSTEM AVAILABLE

Featuring:
- Conventional Report Generator
- Graphic Report Generator
- Matrix Report Generator
- Responsibility Reporting
- Flexible Budgeting Module
- Multiple Currency Version to accommodate foreign subsidiary accounting

asystance
2610 Wycliff Road
Raleigh, North Carolina 27607
(919) 782-7300
New York: (212) 586-5977
Chicago: (312) 256-1810

MSA has the most comprehensive portfolio of accounting systems for commercial and financial applications.

COMMERCIAL
- FIXED ASSETS
- PAYROLL/PERSONNEL
- ACCOUNTS PAYABLE
- MANAGEMENT ACCOUNTING AND REPORTING (GENERAL LEDGER)
- SPECIAL REPORT GENERATOR

MSA

FINANCIAL
- COMMERCIAL LOAN
- INSTALLMENT LOAN
- TIME DEPOSITS
- FINANCIAL INFORMATION AND CONTROL (GENERAL LEDGER & RESPONSIBILITY REPORTING)
- ON-LINE MONITOR
- CIF CONCEPT 72

COBOL IBM 360/370 DOS, OS

WRITE OR CALL:

CHARLES F. SIMS
Marketing
Management Science America, Inc.
1389 Peachtree Street, N.E.
Atlanta, Georgia 30309
404/892-3390

Package Leasing, ISS Cited

Itel Earnings Resume Upward Trend

SAN FRANCISCO – Deliveries of Itel Corp.'s 7330 disk drive systems and profitability of the Computer Products Division's package lease program were a couple of factors cited by President Peter Redfield which contributed to putting the firm back in the black in the third quarter, after a $2.8 million six month loss.

But the major reasons for that loss were start-up costs on the 7330 and the cost of forming a marketing organization for the Computer Products Division, he said.

In the third quarter, earnings totaled $232,000 or 3 cents a share on revenues of $23.1 million compared with the year-ago period, when earnings were $77,000 or 1 cent a share on sales of $25.5 million. Fourth quarter earnings are expected to "more than offset" the six month loss, according to Redfield.

The nine month results show a loss of $2.6 million or 35 cents a share, on revenues of $62.7 million. In the same 1971 period, the firm earned $3.3 million on $81.1 million in revenues.

'73 Earnings Look Good

Redfield expects the boom to continue. "Though it's too early to tell for certain, we expect 1973 earnings to exceed our previous record of $1.10 a share in 1970," he said.

Itel's manufacturing arm, Information Storage Division, is delivering its 7330 disk drives, which were in the development stage in the first half of the year, and "ISS will be shipping an average of over 400 devices a month, compared with fewer than 100 a month during the first six months," he said.

Since the introduction in May of Itel's Computer Products Division's package lease program, orders of more than $30 million at IBM equivalent prices have been received, Redfield said. The plan enables users to lease IBM CPUs and Itel peripherals from one source.

All Divisions Profitable

"One of the significant things about this turnaround is that all of our divisions were profitable in the third quarter," Redfield said.

Itel is currently "in its strongest cash position ever. We have adequate cash reserves to finance growth of our current activities and substantial funds available for new endeavors," he observed.

He expects Itel will soon announce the acquisition of a computer service organization, he added.

* WANTED *

Firms to: Buy, Sell, Lease, Sub-Lease → 360 Systems

Write or Call Collect — Today
Its our only business

NVC COMPUTER SALES, INC.
Suite 618 Benjamin Fox Pavilion, Jenkintown, Pa. 19046
(215) 887-5404

Ware Associates will conduct a
PROJECT MANAGEMENT WORKSHOP

with Combustion Engineering at their Windsor, Conn. facility from Nov. 29 - Dec. 1. The course stresses bringing projects in on time thru time & cost estimates, resource & completion schedules and progress reporting systems. Fee - $225. For further information call or write:

Ware Associates
38 Main Street, Hudson, Mass.
(617) 562-6921

ware associates

CHANCES ARE YOU'RE PAYING MORE FOR YOUR ALPHAMERIC STRIP PRINTER RIGHT NOW

. . . AND WITHOUT SOME OF THESE FEATURES.

- Input US ASCII standard, character by character
- 15 CPS
- 5 x 7 dot matrix presentation of characters
- High character flexibility
- Single print hammer—fewer moving parts

Also available:
4552/01 Signal Input Serial dot-by-dot in the matrix
4552/02 Signal Input parallel column-by-column in the matrix

- Immediate delivery from stock

Facit Odhner Inc. CW-11
501 Winsor Drive
Secaucus, N.J.
Gentlemen:
I am interested in receiving detailed data on your Alphameric Strip Printer
Name Title
Phone
Company
Address
City State Zip

FACIT

Nickels & Dimes

A large no-load income mutual fund, Financial Industrial Income Fund, made an initial commitment of 10,000 shares of common of Burroughs during the quarter ended June 30, for about $2.2 million.

$$$

Computer Products, maker of interface equipment and power modules, has recorded its fourth consecutive profitable quarter as of July 2. Incoming orders for the first half reached $1.2 million from $613,046 secured in the 1971 period.

$$$

Earnings did not keep pace with the increase in second-quarter revenue at Tally because of a lower gross margin created by product mix and heavy expenditures for a new OEM printer.

$$$

Data Recognition attributes its six month $245,395 loss to the slower than expected development of segments of the credit card industry and development costs of a new OCR product, which it plans to unveil sometime this quarter.

At last . . .again – Kappa Systems, a systems analysis and management consulting firm, had its first profitable year since 1969. Earnings totaled $29,651.

$$$

Moving right along, Compuscan has installed a total of 46 Model 170 OCR systems, up from 14 in April, and has expanded its bank credit line to $2.5 million. Earnings for the second quarter are projected to exceed the $106,864 in the first quarter.

$$$

Terminal Data has postponed its proposed offering of 300,000 shares because "current market conditions are inappropriate."

$$$

Boothe Computer Investment plans to sell 90% interest in its portfolio of 11 venture capital investments to the First National Bank of Chicago for $3.2 million. Boothe will retain a 10% interest in the portfolio.

$$$

Revenues from DPA's DP operations reached a record level for the nine months ended Aug. 31.

Display Sales Boost Hazeltine Turnaround In Third Quarter

GREENLAWN, N.Y. – The Hazeltine 2000 display system is proving a hefty contributor to Hazeltine's coffers.

The Industrial Products Division accounted for about 25% of the firm's business, and in the nine months of 1972 shipped about $11.2 million worth of equipment – more than double shipments a year ago, the firm said.

Backlog Up

The 2000 system accounted for about 60% of the Industrial Products Division shipments, according to Hazeltine. Total backlog as of Sept. 30 amounted to $93 million, up from $55 million in January, the firm said.

In the quarter, Hazeltine revenues rose to $13.3 million from $7.2 million a year ago, and earnings before extraordinary credit totaled $88,000 or 5 cents a share, compared with a loss of $163,000 or 8 cents a share last year.

There was a $3.3 million special credit this year from sale of real estate.

A loss of $178,000 in the quarter was charged against product costs for delayed deliveries, primarily on the Scan Converter Avionics Systems contracts with the Air Force and McDonnell Douglas.

Redcor Out of Bankruptcy

CONCORD, Calif. – Redcor Corp. said its proposed Plan of Arrangement under Chapter XI of the Bankruptcy Act has been approved and a final order of confirmation entered.

The plan provides for Redcor to continue operations through its Zeltex subsidiary here. The plan provides for a recapitalization of the company with the secured creditors receiving 75%, the unsecured and administrative creditors receiving 20% and the present shareholders retaining 5% of the common stock of the reorganized company.

Earnings, Revenues Climb in Half, Quarter Periods at Data Products

WOODLAND HILLS, Calif. – Earnings and revenues were up at Data Products Corp. for the quarter and six months ended Sept. 23, with six month revenues reaching a record $27.5 million.

Earnings, before special credit, totaled $432,000 or 6 cents a share compared with $87,000 or 1 cent a share a year ago. After tax credits and other items, the figure jumped to $757,000 or 11 cents a share from $217,000 or 3 cents a share.

In the quarter, earnings totaled $246,000 or 4 cents a share compared with last year's loss of $3,000. Revenues rose to $13.6 million from $11.1 million.

"The incoming order rate has strengthened, and the backlog of firms orders on hand at the end of the first six months is about $26 million, an increase of $2.5 million since the beginning of the year," observed President Graham Tyson.

Operations in Englewood, Colo. are being moved to Woodland Hills. The Dublin, Ireland manufacturing capacity is being doubled, and will handle line printers as well as core, Tyson added.

Overseas sales efforts, both in Japan and Eastern Europe, "have been successful recently and significant orders for equipment have been received. In addition, long-term licensing arrangements have been established in both market areas," he said.

Earnings Reports

CLARY
Six Months Ended June 30

	a1972	a1971
Shr Ernd	$.13	$.53
Revenue	5,989,000	5,128,000
Spec Cred	b94,000	c729,000
Earnings	207,000	762,000

a-Restated to include the results of Alaska-North Rapid Mobile Homes Inc., acquired June 30, 1972. b-Tax loss carryforward. c-Consists of $308,000 tax loss carryforward and a $421,000 gain on sale of future royalties and net assets of an operating division.

ELDORADO ELECTRODATA
Three Months Ended July 31

	1972	1971
Shr Ernd	$.20	.....
Revenue	2,506,235	$930,162
Earnings	206,375	697

MOHAWK DATA SCIENCES
Three Months Ended July 31

	1972	1971
Shr Ernd	$.05	$.08
Revenue	33,466,000	26,380,000
Earnings	289,000	460,000

PLANNING RESEARCH
Year Ended June 30

	a1972	b1971
Shr Ernd	$.50	.....
Revenue	83,312,000	66,193,000
Spec Item	c590,000	d10,289,000
Earnings	3,248,000	(6,828,000)

a-Includes operations of International Reservations Corp. b-Restated to reflect acquisitions on a pooling-of-interests basis. c-Credit; gain from a portion of a 1971 reserve for losses that was not used, less a charge related to discontinuance of the company's 50%-owned European operations. d-Charge; related to startup costs of the company's reservations and real estate services.

BOLT BERANEK & NEWMAN
Year Ended June 30

	1972	1971
Shr Ernd	$.64	$.09
Revenue	18,924,400	16,571,500
Disc Op	.....	(438,800)
Spec Chg	.....	842,000
Earnings	790,100	(730,500)

COMPUSCAN
Three Months Ended Aug. 31

	1972	1971
Shr Ernd	$.06	.....
Revenue	1,024,000	$144,000
Earnings	104,000	(352,000)

TIME SHARING RESOURCES
Year Ended May 31

	1972	1971
Shr Loss	$.13	$.30
Revenue	502,465	230,891
Loss	99,803	232,528

DASA
Nine Months Ended July 31

	1972	1971
Shr Ernd	$.04	.....
Revenue	8,416,000	$12,800,000
Tax Cred	64,000	.....
Earnings	134,000	(116,000)

DEARBORN-STORM
Three Months Ended July 31

	1972	1971
Shr Ernd	$.50	a$.39
Revenue	11,706,000	9,860,000
Earnings	1,352,000	1,034,000
9 Mo Shr	1.32	a1.04
Revenue	33,635,000	28,021,000
Earnings	3,560,000	2,811,000

a-Adjusted for two-for-one stock split in November 1971.

TRADE★QUOTES

Computerworld Stock Trading Summary

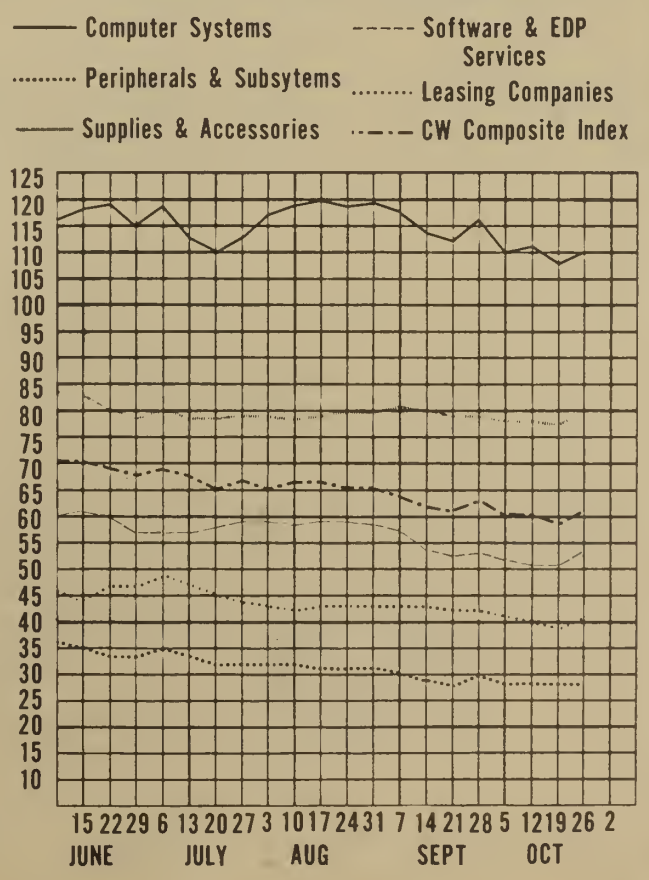
All statistics compiled, computed and formatted by TRADE★QUOTES, INC Cambridge, Mass 02139

CLOSING PRICES THURSDAY, OCTOBER 26, 1972

EXCH		1972 RANGE (1)	CLOSE OCT 26 1972	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	2 1/4	+ 1/8	+5.8
A	APPLIED DATA RES.	4- 7	4 1/8	+ 1/4	+6.4
O	APPLIED LOGIC	1- 4	2 3/4	+ 1/8	+4.7
N	AUTOMATIC DATA PROC	72- 99	96 7/8	+6 5/8	+7.3
O	BRANDON APPLIED SYST	1- 2	1	+ 1/8	+14.2
O	COMPUTER DIMENSIONS	6- 14	6 3/8	0	0.0
O	COMPUTER DYNAMICS	1- 4	1 3/8	+ 1/2	+57.1
O	COMPUTER NETWORK	3- 7	3 3/4	+ 1/2	+15.3
N	COMPUTER SCIENCES	4- 10	5 1/8	+ 1/2	+10.8
O	COMPUTER TASK GROUP	1- 2	1	0	0.0
O	COMPUTER TECHNOLOGY	4- 8	4	0	0.0
O	COMPUTER USAGE	7- 14	8 7/8	- 3/8	-4.0
O	COMP AUTOMOT REPORTS	5- 9	8 1/4	+1 3/4	+26.9
N	COMPUTING & SOFTWARE	14- 28	14 1/4	- 1/8	-0.8
O	COMRESS	1- 3	1 1/4	+ 1/4	+25.0
O	COMSHARE	5- 10	7 3/4	+ 1/2	+6.8
O	DATATAB	5- 9	4 1/2	0	0.0
O	EDP RESOURCES	2- 8	2 1/4	- 1/2	-18.1
A	ELECT COMP PROG	1- 5	1 3/8	- 1/8	-8.3
N	ELECTRONIC DATA SYS.	43- 65	50 1/2	-2 3/4	-5.1
O	INFORMATICS	5- 11	5 3/8	- 1/8	-2.2
O	I.O.A. DATA CORP	1- 3	1	- 1/8	-11.1
O	KEANE ASSOCIATES	4- 7	4	0	0.0
O	KEYDATA CORP	7- 13	12	- 1/4	-2.0
O	LOGICON	4- 9	5 3/4	- 3/8	-6.1
A	MANAGEMENT DATA	4- 10	4 1/4	+ 1/4	+6.2
O	NATIONAL CSS INC	8- 28	27 1/8	+ 5/8	+2.3
O	NATIONAL INFO SRVCS	2- 5	1 7/8	+ 3/8	+25.0
P	ON LINE SYSTEMS INC	8- 20	22 1/4	- 3/4	-3.2
N	PLANNING RESEARCH	6- 17	6 3/4	- 1/8	-1.8
O	PROGRAMMING METHODS	20- 24	21 1/2	0	0.0
O	PROGRAMMING & SYS	1- 2	1 1/4	0	0.0
O	RAPIDATA INC	5- 25	23 1/4	+2 1/4	+10.7
D	SCIENTIFIC COMPUTERS	2- 4	2	+ 1/8	+6.6
O	SIMPLICITY COMPUTER	1- 5	3 3/8	0	0.0
O	TBS COMPUTER CENTERS	3- 6	3 1/4	0	0.0
O	TCC INC	1- 3	1 1/8	0	0.0
O	TYMSHARE INC	7- 11	9	+1 3/8	+18.0
O	UNITED DATA CENTER	5- 8	6 1/4	0	0.0
N	UNIVERSITY COMPUTING	13- 26	12 1/2	- 1/4	-1.9
A	URS SYSTEMS	6- 10	7 3/4	- 1/8	-1.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	34- 49	40 1/8	+2	+5.2
O	ADVANCED MEMORY SYS	12- 23	18 1/4	+1 1/2	+8.9
N	AMPEX CORP	5- 15	6 1/8	+ 7/8	+16.6
O	ANDERSON JACOBSON	5- 8	3 1/2	- 1/8	-3.4
O	ATLANTIC TECHNOLOGY	1- 11	1/4	- 1/8	-33.3
O	BEEHIVE MEDICAL ELEC	1- 6	6 1/4	+1 1/2	+31.5
A	BOLT,BERANEK & NEW	5- 21	14 5/8	+1 1/4	+9.3
N	BUNKER-RAMO	9- 14	9 3/4	+ 1/8	+1.2
A	CALCOMP	10- 25	10 1/2	0	0.0
O	CAMBRIDGE MEMORIES	9- 15	9 3/4	+ 3/4	+8.3
O	CENTRONICS DATA COMP	6- 27	21 1/2	+1 1/2	+7.5
O	COGNITRONICS	2- 5	2 1/4	- 3/8	-14.2
O	COMPUTER COMMUN.	1- 7	3	- 1/8	-4.0
A	COMPUTER EQUIPMENT	3- 4	2 5/8	- 1/8	-4.5
O	COMPUTER MACHINERY	7- 13	9 3/8	+1 1/4	+15.3
A	COMPUTEST	3- 9	3 7/8	+ 1/8	+3.3
A	DATA PRODUCTS CORP	3- 7	3 7/8	+ 1/8	+3.3
O	DATA RECOGNITION	1- 5	1 1/4	0	0.0
O	DATA TECHNOLOGY	2- 5	2 5/8	- 1/8	-4.5
O	DI/AN CONTROLS	0- 8	4 1/2	0	0.0
N	ELECTRONIC M & M	3- 8	4 1/4	+ 7/8	+25.9
O	FABRI-TEK	2- 5	3 1/2	+ 1/8	+3.7
O	GENERAL COMPUTER SYS	7- 16	7 1/2	- 1/4	-3.2
N	GENERAL ELECTRIC	59- 70	63 7/8	+2	+3.2
N	HAZELTINE CORP	7- 13	7 3/4	- 3/8	-4.6
O	INFOREX INC	20- 36	20	-1	-4.7
O	INFORMATION DISPLAYS	1- 5	1 5/8	0	0.0
A	LUNDY ELECTRONICS	9- 14	9 3/8	+ 1/4	+2.7
O	MANAGEMENT ASSIST	1- 2	3/8	0	0.0
N	MEMOREX	16- 38	21 1/2	+1	+4.8
A	MILGO ELECTRONICS	15- 44	16	- 7/8	-5.1
N	MOHAWK DATA SCI	14- 27	16 3/8	+1 3/8	+9.1
O	OPTICAL SCANNING	6- 16	6 1/2	0	0.0
O	PERTEC CORP	8- 17	8 5/8	-1 5/8	-15.8
O	PHOTON	6- 15	8 3/8	- 1/8	-1.4
A	POTTER INSTRUMENT	7- 21	7 3/4	0	0.0
O	PRECISION INST.	4- 13	4 1/2	- 1/2	-10.0
O	RECOGNITION EQUIP	5- 15	5 1/4	- 1/4	-4.5
N	SANDERS ASSOCIATES	13- 21	14 1/8	+ 3/8	+2.7
O	SCAN DATA	5- 13	4 7/8	+ 1/4	+5.4
O	STORAGE TECHNOLOGY	17- 39	27 1/4	-1 1/2	-5.2
O	SYCOR INC	7- 11	9 3/4	+ 3/4	+8.3
O	TALLY CORP.	8- 15	10 7/8	+ 7/8	+8.7
N	TEKTRONIX INC	34- 64	50 7/8	+ 1/4	+0.4
N	TELEX	6- 15	7	+ 1/8	+1.8
O	WILTEK INC	10- 26	15 1/2	- 1/2	-3.1
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	6- 9	7	0	0.0
A	BARRY WRIGHT	9- 14	11 3/8	+ 1/2	+4.5
A	DATA DOCUMENTS	17- 26	21	+1	+5.0
O	DUPLEX PRODUCTS INC	8- 16	8 1/2	+ 1/2	+6.2
N	ENNIS BUS. FORMS	6- 10	6	+ 1/8	+2.1
O	GRAHAM MAGNETICS	15- 27	18 3/8	+1 7/8	+11.3
O	GRAPHIC CONTROLS	12- 15	13 3/8	0	0.0
N	3M COMPANY	76- 85	81 7/8	+5 1/4	+6.8
O	MOORE CORP LTD	42- 56	51	-1 7/8	-3.5
N	NASHUA CORP	48- 62	58	+ 7/8	+1.5
N	REYNOLDS & REYNOLD	37- 77	44 3/8	+ 1/8	+0.2
O	STANDARD REGISTER	14- 20	15 3/4	- 1/2	-3.0
O	TAB PRODUCTS CO	14- 23	21	+1	+5.0
N	UARCO	21- 28	21 7/8	+ 1/2	+2.3
A	WABASH MAGNETICS	6- 11	6 7/8	+ 3/8	+5.7
N	WALLACE BUS FORMS	21- 26	23 7/8	+2 7/8	+13.6
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-226	222 1/2	+9	+4.2
N	COLLINS RADIO	14- 20	14 1/2	- 1/4	-1.6
N	CONTROL DATA CORP	43- 78	66 3/4	+3 1/2	+5.5
O	DATA GENERAL CORP	56-115	110	+1 1/2	+1.3
D	DIGITAL COMP CONTROL	9- 25	8 1/2	+ 1/2	+6.2
N	DIGITAL EQUIPMENT	72-101	85 1/4	-12	-12.3
N	ELECTRONIC ASSOC.	6- 13	8 3/4	+ 1/4	+2.9
A	ELECTRONIC ENGINEER.	6- 14	8 3/8	+ 1/4	+3.0
N	FOXBORO	23- 41	23 1/4	-1 3/4	-7.0
O	GENERAL AUTOMATION	13- 38	33 1/4	+2	+6.3
O	GRI COMPUTER CORP	2- 5	2 5/8	- 1/2	-16.0
N	HEWLETT-PACKARD CO	46- 77	69	+1 3/8	+2.0
N	HONEYWELL INC	122-170	126 3/4	-7 1/4	-5.4
N	IBM	333-426	377 1/2	-1	-0.2
O	INTERDATA INC	8- 16	11 5/8	0	0.0
D	MICRODATA CORP	5- 10	8	+ 1/2	+6.6
N	NCR	29- 38	34 1/2	+1 3/8	+4.1
N	RAYTHEON CO	27- 47	28 5/8	+1	+3.6
N	SPERRY RAND	30- 48	47 1/4	+1 3/8	+2.9
A	SYSTEMS ENG. LABS	9- 16	8 5/8	- 3/8	-4.1
N	VARIAN ASSOCIATES	14- 22	21 1/8	+2	+10.4
N	VICTOR COMPTOMETER	15- 24	16 3/4	+ 3/8	+2.2
N	WANG LABS.	23- 61	26 1/4	+1 3/4	+7.1
N	XEROX CORP	121-172	160 1/4	+8 1/4	+5.4
	LEASING COMPANIES				
A	BOOTHE COMPUTER	4- 18	4 1/2	+ 1/4	+5.8
O	BRESNAHAN COMP.	2- 3	1 1/2	- 1/4	-14.2
O	COMDISCO INC	3- 18	15	- 1/2	-3.2
O	COMMERCE GROUP CORP	5- 11	6 3/4	+ 3/8	+5.8
O	COMPUTER EXCHANGE	1- 3	3/4	- 1/8	-14.2
A	COMPUTER INVSTRS GRP	7- 14	7 1/2	0	0.0
N	DPF INC	5- 13	5 1/2	0	0.0
M	DATRONIC RENTAL	2- 4	2 1/8	+ 1/4	+13.3
A	DCL INC	4- 10	4 1/8	+ 3/8	+10.0
A	DEARBORN-STORM	16- 26	19 1/4	+1	+5.4
A	DPA, INC.	5- 8	6 7/8	+ 1/2	+7.8
A	GRANITE MGT	5- 11	6 1/4	+ 1/8	+2.0
A	GREYHOUND COMPUTER	6- 11	6 1/2	+ 1/4	+4.0
A	ITEL	7- 12	9 1/8	- 1/4	-2.6
N	LEASCO CORP	17- 24	19	+1 5/8	+9.3
O	LEASPAC CORP	6- 15	7	+ 1/4	+3.7
O	LECTRO MGT INC	1- 4	2 1/4	+ 1/2	+28.5
A	ROCKWOOD COMPUTER	2- 7	2 1/4	0	0.0
O	SYSTEMS CAPITAL	3- 20	11 1/4	- 5/8	-5.2
N	U.S. LEASING	19- 33	28 1/8	+3 1/8	+12.5

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; D=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

COMPUTING & SOFTWARE
Three Months Ended July 31

	1972	a1971
Shr Ernd	$.33	$.25
Revenue	29,526,000	24,341,000
Loss Disc Op	80,000	93,000
Earnings	1,994,000	1,568,000
9 Mo Shr	.94	.78
Revenue	79,374,000	68,302,000
Loss Disc Op	50,000	166,000
Earnings	5,629,000	4,778,000

a-Restated to reflect acquisitions on a pooling-of-interests basis.

COMPUTER DATA SYSTEMS
Year Ended June 30

	1972	1971
Shr Ernd	$.18	$.02
Revenue	1,410,000	1,110,100
Tax Cred	39,500	2,100
Earnings	95,800	9,500

COMPUTER INSTRUMENTS
Six Months Ended July 14

	1972	a1971
Shr Ernd	$.02	$.01
Revenue	2,472,283	2,298,523
Earnings	32,638	9,401

a-Restated.

MATHMATICA
Year Ended June 30

	a1972	1971
Shr Ernd	$.69	$.53
Revenue	7,586,000	5,603,000
Earnings	452,000	280,000

a-Preliminary.

LUNDY ELECTRONICS & SYSTEMS
Year Ended June 30

	1972	1971
Shr Ernd	$.52	.....
Revenue	18,019,758	$12,545,426
Disc Op	(56,494)	.....
Earnings	447,614	(1,427,835)

NATIONAL COMPUTER SYSTEMS
Three Months Ended July 31

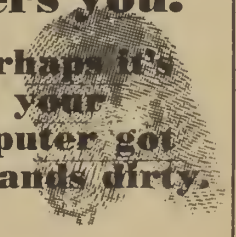
	1972	1971
Shr Ernd	$.16	$.09
Revenue	1,082,000	1,038,000
Earnings	84,780	48,952
6 Mo Shr	.14	.14
Revenue	2,003,000	1,944,000
Earnings	73,538	72,545

COM-SHARE
Year Ended June 30

	1972	1971
Shr Ernd	$.29	.....
Revenue	6,773,276	$5,231,956
Spec Cred	a260,585	b286,343
Earnings	313,012	(1,204,031)

a-Consists of a $103,585 gain on disposition of assets and a $157,000 tax loss carryforward credit. b-Gain on disposition of assets.

COMPUTER RIBBONS
Top quality heavy duty nylon ribbons—all IBM compatible—for every application.
ISC/PRYOR COMPUTER
FOUNDED 1959
Chicago Milwaukee Indianapolis Cleveland Pittsburgh New York Baltimore

Better material control is what the Sierra 770 System offers you.
Perhaps it's time your computer got its hands dirty.

Research Corporation
Sierra
Data Systems Division
217 Middlesex Turnpike
Burlington, Massachusetts,01803
Telephone (617) 273 0900

GRASP

FOR DOS 360's and 370's

A DOS enhancement package to deliver more performance from your system. Typical users gain at least 20% more throughput, often eliminate hardware, and reduce overtime costs of people and equipment. Small user or large, **GRASP** warrants your most careful consideration.

EFFECTIVE: "Has given the operation of our computer center a pace never possible before."
"GRASP has increased our thruput to such an extent that we have been able to discontinue the lease on our IBM 360/30."
"GRASP has enabled us to completely eliminate the need for our printer and one card reader/punch."

RELIABLE: "GRASP has never failed in this shop."
"GRASP has never lost us one minute by malfunctioning."

SUPPORTED: "The response to the few minor problems encountered with GRASP was swift and accurate."
"The degree of professionalism displayed by SDI people with whom I've dealt has been superb."

Please send information on **GRASP** to:

Name _____

Company _____

Address _____

City, State _____

Telephone _____

We have a 360/370 Model _____, _____

SOFTWARE DESIGN INC.
872 Hinckley Road
Burlingame, California 94010
Tele. 415-697-3660